

AUGUST 5, 1961

Chemical Week

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Chlorine paradox?

New capacity coming; but old markets are threatened . p. 45

Pollution control.

'Pound of prevention' is P&G's way to hold down cost . p. 52

Adipic: new process, new producer liberate captive chemical p. 83

Big-ring olefins leave lab, bid for building-block and monomer jobs . p. 93

◀ **SPECIAL REPORT:
STAKES IN LATIN
AMERICA . . . p. 63**

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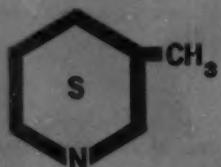
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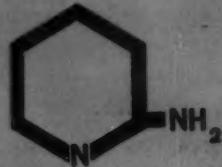
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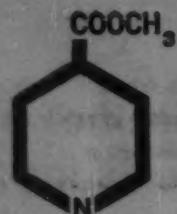
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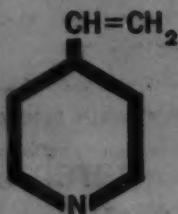
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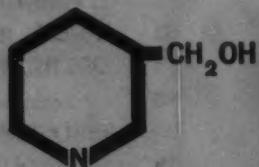
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ON THE COVER: Yankee oil drillers at work among the palm trees symbolize U.S. efforts to bolster its part in Latin-American growth—in face of stiff ideological competition (p. 63).

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No Easy Latin Solution

MOST U. S. BUSINESSMEN are frustrated when they think about Latin America—and so they prefer, whenever possible, not to think about it at all. They see it as a vast continent endowed with abundant resources, controlled by a wealthy handful of landowners who retain their grip through ruthless dictators supported by huge armies. They read about a coup here, a military junta there, an uprising in a third country, and ask, "What's the use?"

Unfortunately, there's considerable truth in this picture. But the difficulty of changing it shouldn't be permitted to discourage us from investing private and public funds as wisely as we can—private money for mutual profit, public money to bolster the Western world.

There is a lot of criticism of President Kennedy's proposals as expressed in the Alliance for Progress (*see p. 63*). "In the business community there is growing opposition to the whole venture," *Business Week* reported last month, "not so much because our aid spending will go up as because the new goal doesn't seem to make sense. . . . A U.S. policy of sponsoring revolutionary change in the underdeveloped countries could well undermine the position of U.S. private investment . . ."

Accompanying the fear of revolution is the distrust of government intervention. In the past, when Latin Americans faced a choice between a private project financed by foreign money or a public project financed by the local government, they have often chosen the latter. In the words of Raul Prebisch, Argentine banker who is now an Under-Secretary of the United Nations: "[The Latin Americans] are not convinced that development problems can be left entirely to the free play of economic forces. They do believe in energetic action by the state, and in the need for the planning of development. At a time when man is reaching unsuspected heights in his dominion over natural forces, they are convinced of the need for conscious and deliberate action with regard to economic forces, if their development goals are to be achieved."

That certainly doesn't sound like U.S.-brand capitalism. But radical as Prebisch may sound to a conservative businessman, he believes that there is a necessary role for private investment to fill. And as U.S. chemical companies have discovered in Mexico and India, they can accept changes in the traditional rules and still make a profit.

Do we really have a choice, as Kennedy's critics imply, between promoting social revolution or encouraging the *status quo*? Prebisch doesn't think so: "If opportunities are lost by those who could now undertake these changes, they will be made by others who are swept into power on the rising tide of popular aspirations. It is no longer a question of whether or not such changes will take place, but of who will make them, by what methods and under what political philosophies."

It's tough to be asked to pay the piper and not be permitted to call the tune. But what tune would we call if we could? The simple tune of private investment, of course, is profit; but our foreign policy calls for something more richly orchestrated—helping Latin America to develop within the framework of a democratic Western world orientation. As Prebisch puts it: "The desire of foreigners to find new fields for private capital investment . . . is a legitimate one, but it cannot be the principal aim nor the one which most influences policy. The basic objective must be to enable the Latin Americans gradually to do for themselves what the more advanced countries can already do."

Despite all these problems, our aid—if it can prove the benefits of private enterprise as the Marshall Plan did in Europe—can help minimize the drift of Latin America from a free economy.

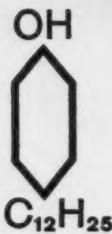
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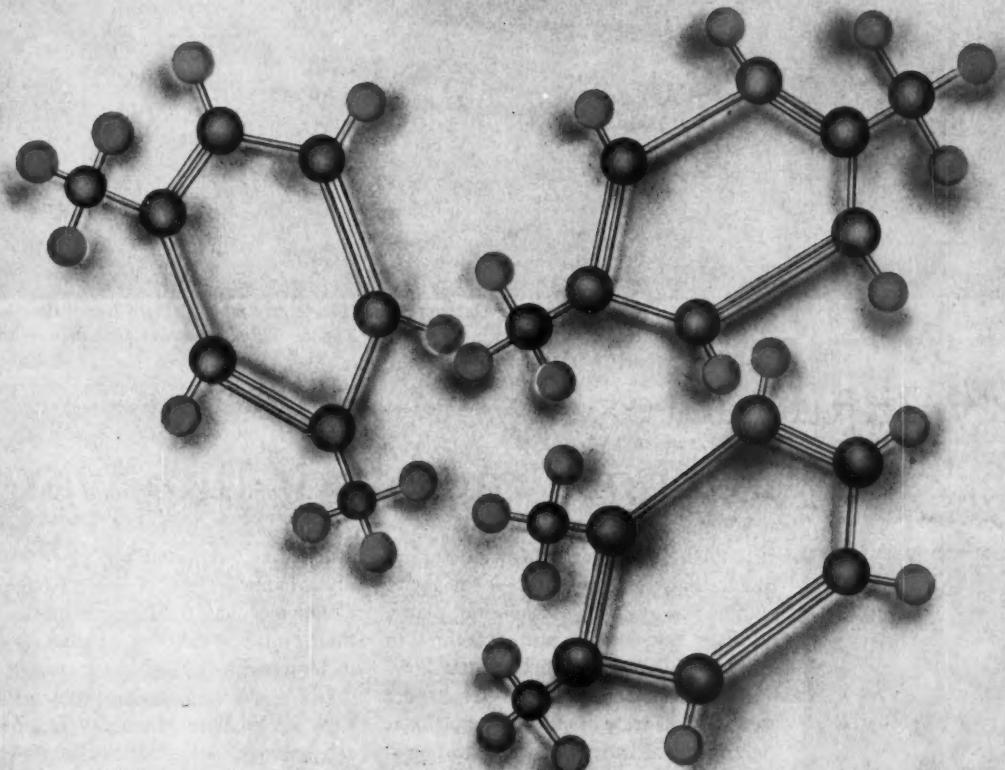
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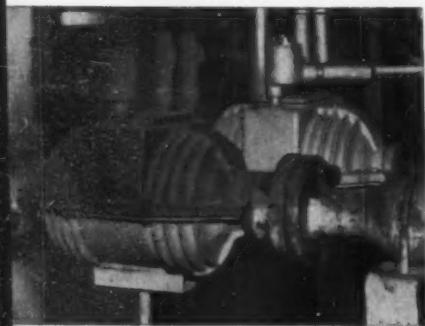
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LETTERS

Ambiperm Practicality

TO THE EDITOR: In his letter (*July 8, p. 11*) I. M. Abrams contends that the Ambiperm process for sodium recovery from sulfite waste liquors was not unique and cites a number of patents pertaining to the use of ion exchange for treating waste sulfite liquor. None of these provided a practical process for base recovery; witness the fact that no commercial application has been made.

The specific modifications in operating procedure and equipment design employed in the Ambiperm process are precisely the techniques that distinguished this new process from those patented over the last 15-20 years. The economics of the Ambiperm process as shown in the original paper will lead to practical commercial installations shortly.

D. C. SENGES
Manager, Special Markets
The Permutit Co. Division
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New York

Plastic Plumbing

TO THE EDITOR: Your article "For Plastics—A Welcome Home?" (*July 15, p. 21*) was most interesting to us.

It will be five years this September that we started to sell Vulcathene (polyethylene) drainline systems. Prior to that, there had been five years of basic experience in England and other parts of the world with such systems. We selected to sell the corrosion-resistant properties of our product first. Therefore, we concentrated on laboratory installations.

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It has not been easy, but if you have a good product and sell conservatively, and if you have a great deal of persistence, a new material can be introduced into the building field.

I would like to call to your attention that the new Shell Building in London, England, is almost completely plumbed in Vulcathene.

EMANUEL GOLDBERG
President
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MEETINGS

18th International Congress of Pure and Applied Chemistry, Montreal, Can., Aug. 6-12.

Industrial Research Conference, Arden House, Columbia University, Harriman, N.Y., Aug. 6-12.

Western Resources Conference, "Land and Water Planning for Economic Growth," Colorado State University, Fort Collins, Colo., Aug. 7-11.

Gordon Research Conferences, Colby Junior College, New London, N.H.—Aug. 7-11, separation and purification; Aug. 14-18, instrumentation; Aug. 21-25, food and nutrition; Aug. 28-Sept. 1, cancer; New Hampton School, New Hampton, N.H.—Aug. 7-11, statistics in chemistry and chemical engineering; Aug. 14-18, analytical chemistry; Aug. 21-25, inorganic chemistry; Aug. 28-Sept. 1, adhesion; Kimball Union Academy, Meriden, N.H.—Aug. 7-11, toxicology and safety evaluations; Aug. 14-18, chemistry and physics of solids; Aug. 21-25, photonuclear reactions; Aug. 28-Sept. 1, high-temperature chemistry—molten salts; Tilton School, Tilton, N.H.—Aug. 7-11, glass.

Technical Assn. of the Pulp and Paper Industry, Wood Chemistry Committee, 1961 lignin symposium, Edgewater Beach Hotel, Chicago, Aug. 14-16.

University of Michigan, Cryogenic Engineering Conference, Ann Arbor, Mich., Aug. 15-17.

Chemical Market Research Assn. meeting, Lake George Sagamore Hotel, Bolton Landing, N.Y., Sept. 10-12.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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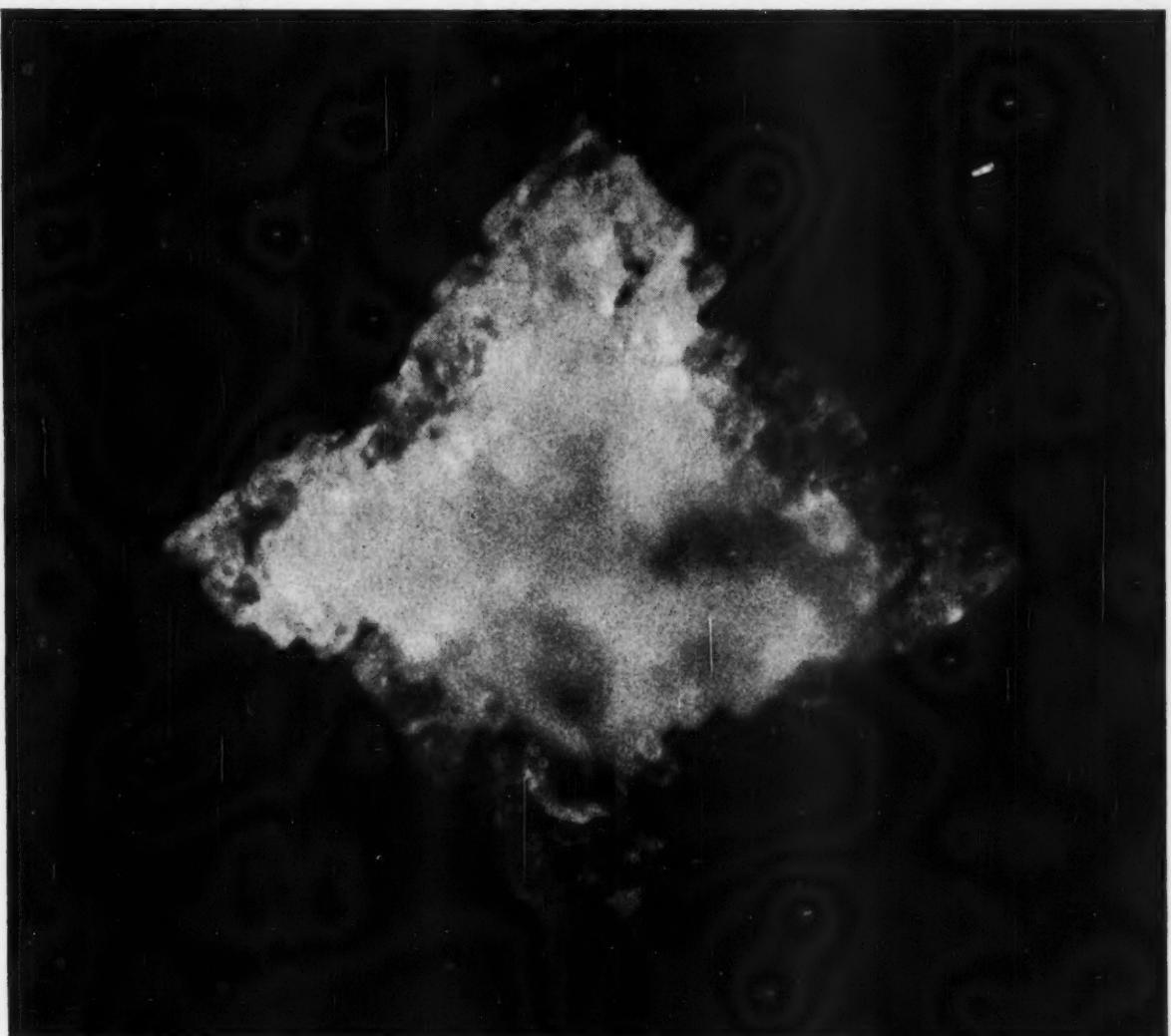
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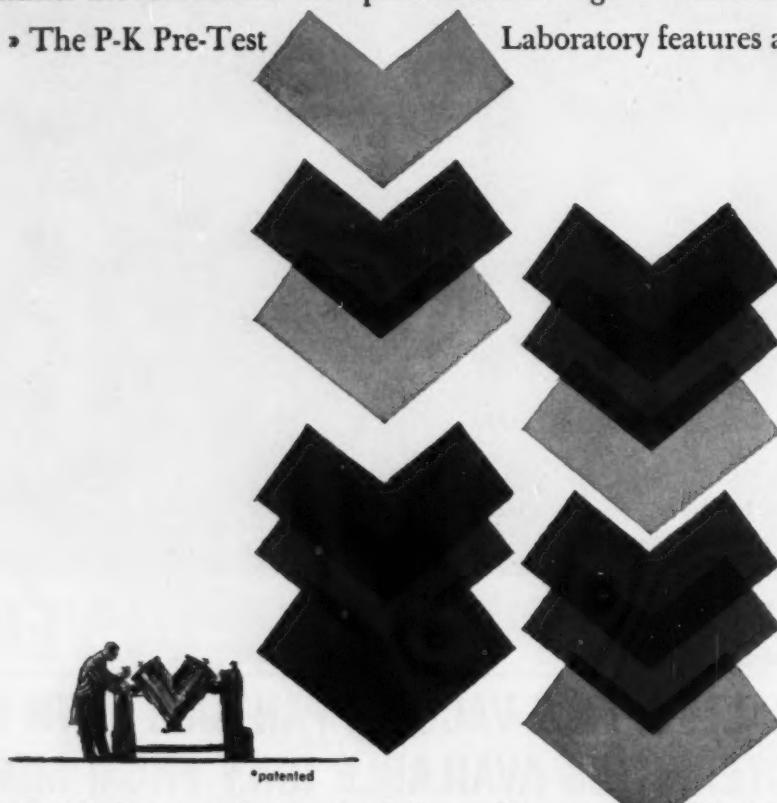
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Solids processing operations are seen in new perspective at the unique P-K Pre-Test Laboratory. Revolutionary new solids processing equipment blends liquids and solids, granulates, vacuum dries, coats, reacts chemicals, sterilizes — telescopes as many as ten conventional multi-step operations into a single unit. Pre-testing provides accurate scale-up data and operational procedures. And it justifies modernization with predictable savings in materials, labor and equipment.

» » » The P-K Pre-Test

Laboratory features a pilot model of the



new P-K Solids Processor*. Standard, intensifier and Blenders are also available, as are vacuum tumble dryers, double cone blenders and ribbon blenders. » » » Here too, P-K engineers who have run thousands of resultful pre-tests work out subtle variables in blending, granulating, drying — point out improvements in quality control and process modification impossible to see without pre-testing. » » » Why not explore the possibilities of improving your current processing methods? You can bring or send your materials. For particulars and a preliminary evaluation, write or phone George Sweitzer at Stroudsburg. Dial direct: 717-HA 1-7500.

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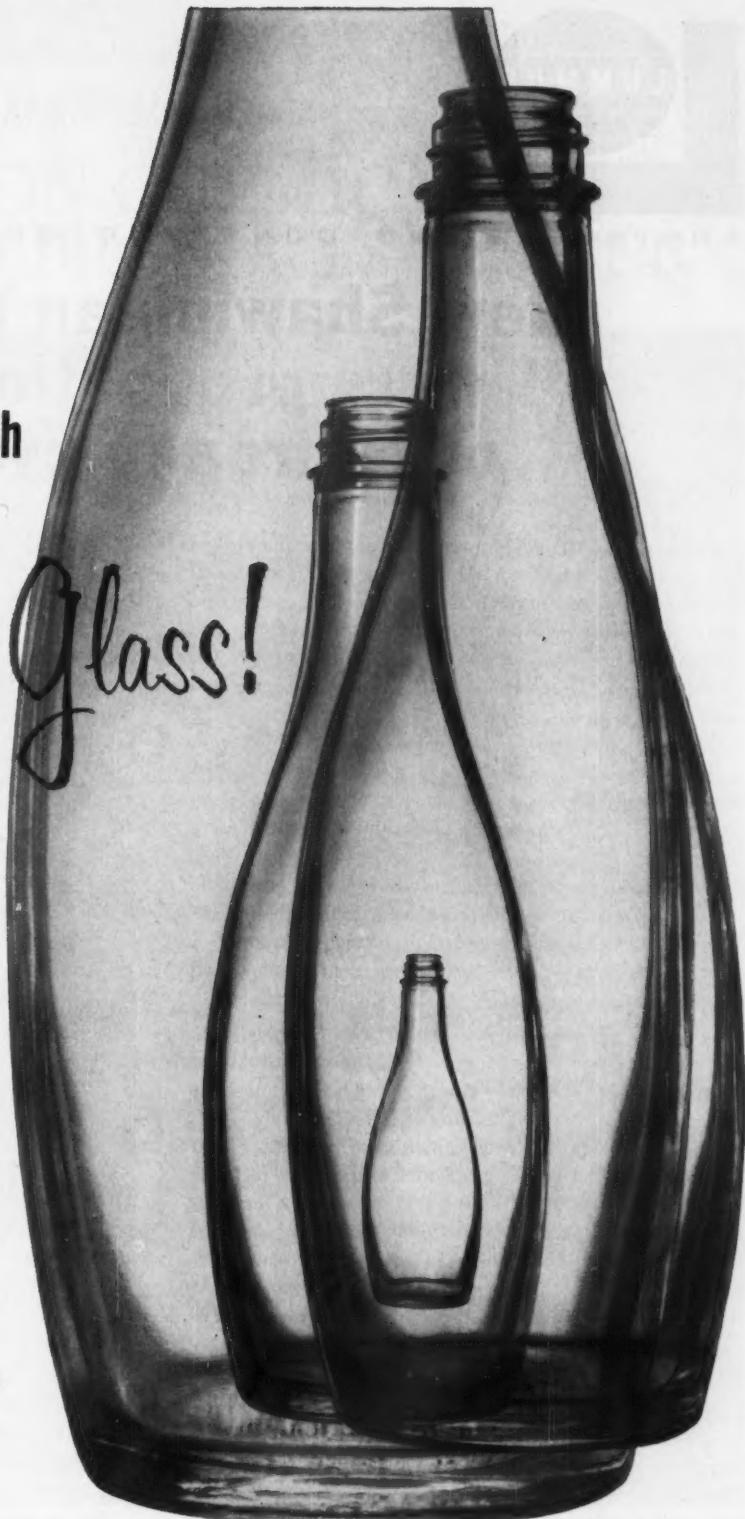
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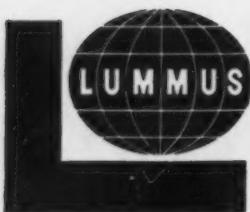


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ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

New Shawinigan process lowers production cost of hydrogen cyanide

A new hydrogen cyanide process, developed by Shawinigan Chemicals Ltd. of Canada and available through The Lummus Company, produces HCN from ammonia and hydrocarbon (methane or propane) in a non-catalytic, oxygen-free reaction. The process — first commercial application of the "FLUOHMIC"® reactor — offers low production costs and ease of operation.

Yields on hydrocarbon and ammonia exceed 85% with negligible undecomposed ammonia carry-through, simplifying recovery or disposal requirements. Furthermore, valuable high-purity hydrogen by-product is available for use as required.

The Shawinigan HCN process produces hydrogen cyanide competitively using 8 mill power and 25-30¢ per MSCF natural gas. It becomes increasingly attractive in areas of lower power costs or higher cost hydrocarbon. A commercial scale reactor is being operated by Shawinigan Chemicals Ltd.

How the Process Works

The reaction system uses a uniquely designed fluidized bed reactor to realize the efficiencies of a very high temperature in the hydrogen cyanide reaction.

The Shawinigan HCN reactor consists of a refractory lined electrically heated vessel. It operates in the range of 2,400 to 3,000° F. at essentially atmospheric pressure. A non-consumed fluidized bed of coke particles is heated by electrical conduction. The reactor design achieves an extremely uniform high temperature throughout the reaction zone. At these very high temperatures the significant improvement in conversion rates — compared with conventional processing — results in a high concentration of product in the effluent gas. The effluent gas is cooled and purified by standard methods.

Process Advantages

Some major advantages of this process are: (1) Absence of water from the effluent gas. This eliminates the problem of tarry polymer formation in the cooling and recovery section. (2) Considerable reduction in unreacted ammonia in the effluent gas. This eliminates the problem of recovery or disposal of unreacted ammonia. A typical carry-through ammonia content would be 0.3 volume % on net reactor effluent. (3) Greatly reduced stringency in feed-stock purity requirements. This is a natural result of the elimination of catalysts



View of the Hydrogen Cyanide Reactor in operation at The Shawinigan Chemicals Limited Cyanide Plant.

from the process. (4) Flexibility in choice of hydrocarbon feed. L.P.G. can be used where natural gas supply is unavailable or interruptible. (5) Operating rates are flexible. Units will perform well at rates as low as 25% of capacity. (6) High concentration of HCN in the reactor effluent. This may be 5-6 times as high as in present commercial processes.

For further details on this process, contact your nearest Lummus office.

*Trademark — Shawinigan Chemicals Limited

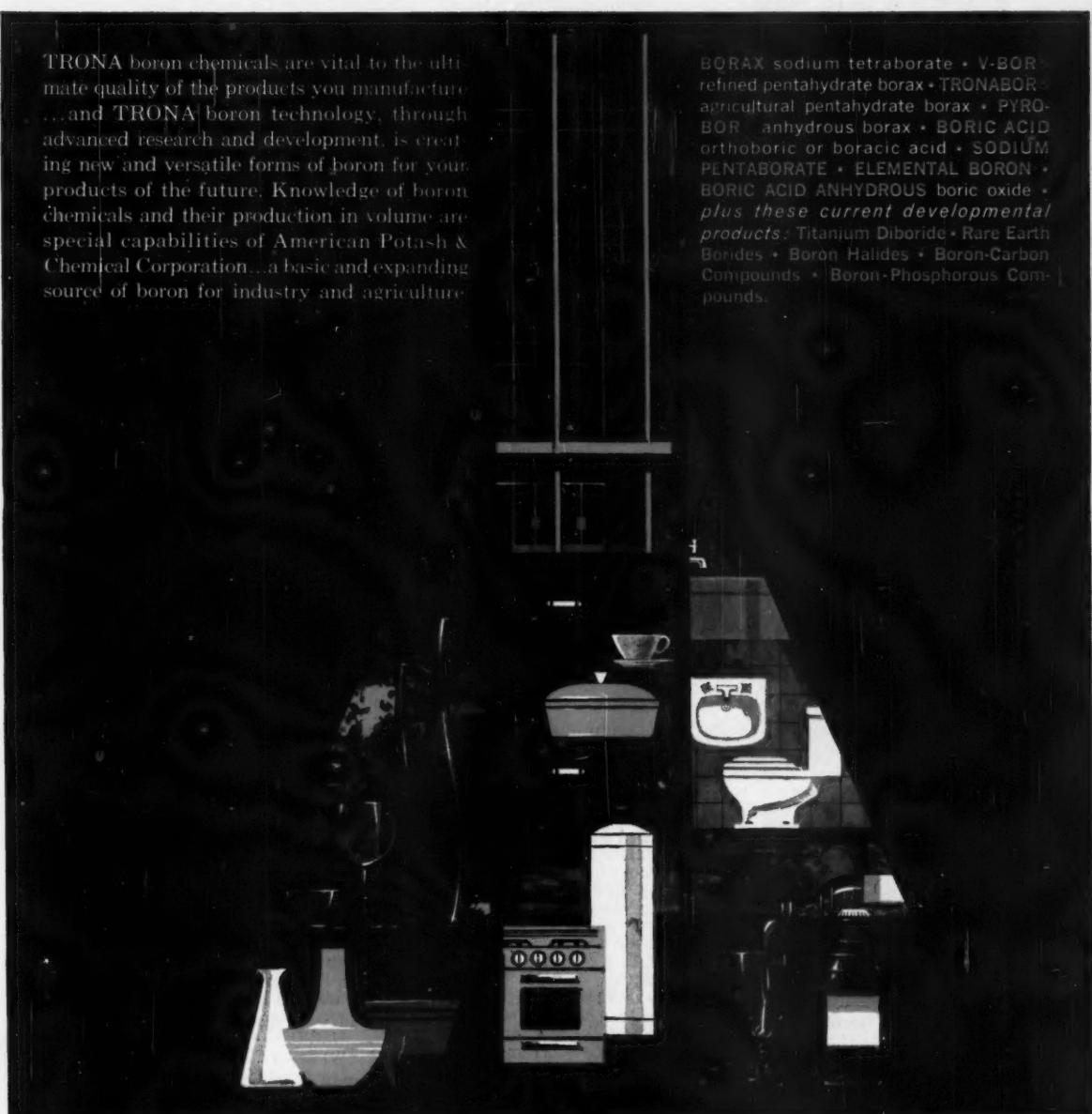
THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, New York, Houston, Washington, D. C., Montreal, London, Paris, The Hague, Madrid; Engineering Development Center: Newark, N. J.

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TRONA boron chemicals are vital to the ultimate quality of the products you manufacture...and TRONA boron technology, through advanced research and development, is creating new and versatile forms of boron for your products of the future. Knowledge of boron chemicals and their production in volume are special capabilities of American Potash & Chemical Corporation...a basic and expanding source of boron for industry and agriculture.

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ONE OF A SERIES OF CHATS ABOUT THE
CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

DOWNTIME DOWN —OUTPUT UP

Continuous processing . . . two big words in the world of chemicals . . . and one big headache when the processing has to stop unexpectedly. It's not just the pure pain in the neck that mechanical failure produces. It's the production costs that keep mounting during down-time.

Let's face it, no one can eliminate every bug. But steam trap failure is a bug there's no excuse for. Not since Sarco created the Thermo-Dynamic Steam Trap, Type TD-50.

For example, Reichhold Chemicals know how bugless it is. They have standardized on this unique steam trap in their new Maleic Anhydride plant at Elizabeth, New Jersey. Of their 320 TD-50's, most are in service on 35-lb. steam tracer lines.

Results? Results! For one thing, Reichhold has learned that TD-50's hardly know the meaning of the word downtime. Then, too, maintenance people like them for their ease of inspection and



The character pretending to inspect one of Reichhold's TD-50's is Sarco's ad manager, who normally wears a gray flannel suit. We're happy to see strainers used properly on this 14-trap manifold to protect the steam traps, even if they don't happen to be Sarco strainers.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both—to the point where you'll communicate.

5902

service. And TD-50's don't require high quality steam to function. We don't want to sound like an advertisement, but it's this way: the TD-50 is so simply designed it has only one moving part; its performance is uniform; it operates equally well on heavy, light, or no condensate load—even against back pressures up to 50% of inlet pressures; it's so rugged that superheat, water hammer, vibration, or corrosive condensate won't affect it; if you should ever want to service a TD-50, a highly unlikely prospect, you can unscrew the cap, clean it, blow it down, and have it back on stream in 40 seconds.

MR. BERNOULLI HELPS BUILD A BETTER STEAM TRAP

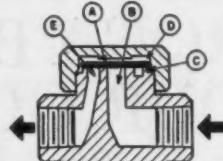
We may be a trifle tardy in bringing it up, but Daniel Bernoulli, who dreamed up the "Bernoulli Effect" about 250 years ago, deserves some sort of accolade from us here at Sarco. A plaque perhaps, or his name in the foyer floor tile. Daniel was a famous Swiss mathematical genius and he was probably a little hesitant about even mentioning his slightly offbeat discovery, the "Effect," in *Hydrodynamica* (1738).



If you happen to have a spool handy, you can perform the simple "effect" right at your desk. Lay a cardboard disc with a pin through it on the table. Place the spool over the pin and blow—hard—and lift. The disc won't fall until you stop blowing because the air under pressure expands between the end of the spool and the disc. The pressure in this space is actually less than atmospheric, and the sum of the downward forces is less than the upward force of atmospheric pressure acting upon the disc's bottom side.

Well, of course it sounds rather remote, but what seemed like a simple parlor trick to Bernoulli has made it possible for us at Sarco to solve steam trapping problems by the dozens. In our Sarco Thermo-Dynamic Steam Trap, Type TD-50, the cardboard disc is replaced by a stainless steel disc A, the spool tube by inlet tube B. The disc also acts as a valve and can seat on B, and also on outer seat ring C. When seated, the disc seals the inlet and the chamber D from the outlet E. Full attention now, because it could easily be your steam, condensate,

or air we're following here as it enters the trap, its pressure raising the disc and allowing fluid to flow radially across the underside of the disc. The velocity of air or condensate is comparatively low, exerting little influence on the disc, which remains



clear of the seat, allowing free discharge. Ah, but now steam enters the trap. Velocity increases greatly because of the steam's greater internal energy. Presto! The disc is pulled toward the seat just as was the cardboard. At the same time, the radial steam jet raises the pressure in D by recompression, snapping the disc down on the seat.

Downward force of recompressed steam in D, acting on the full area of the disc, is greater than the upward force of the inlet steam acting on the smaller area of the inlet orifice. So the disc remains seated, stopping all flow of steam, until pressure in D is reduced by condensation, and the cycle is repeated.

BEYOND THE TD-50 PRINCIPLE

Surprise! In spite of the one-track subject matter you've had the decency to ingest so far, we manufacture a good deal more than TD-50's. As a matter of proud fact, we are the only company that makes and sells all five types of steam traps. After all, there is a place for Balanced Pressure Thermostatic, Float Thermostatic, Camlift Bucket, and Liquid Expansion Thermostatic Steam Traps too. And our knowledgeable engineers can tell you exactly where to use what—and how. And may we modestly add, that's only the beginning? As long as our present conversation seems to consist of product name dropping, we'll just mention the fact that we make exceptionally fine pressure and temperature regulators of rather astonishing variety and ingenuity. For example, we have a complete line of self-powered regulators for heating and cooling. And to make most effective use of these last few lines—strainers of all kinds—even hand and motor operated scraper strainer types. We could fill this page with lists of applications, testimonials, and specifications, but it would be eminently more sensible simply to say: Tell us your problem. Write us direct, or contact your local Sarco sales representative or sales office.



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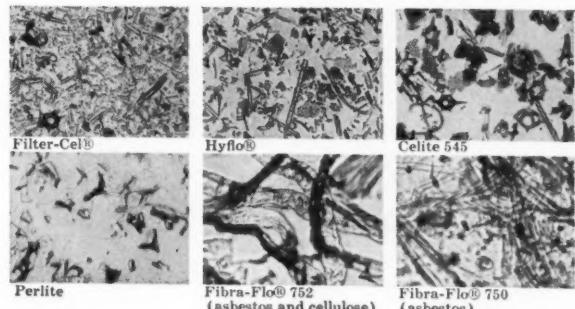


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Celite® diatomite filter aids do the fastest, most thorough job of giving liquid products truly sparkling clarity. Because of its unique particle structure and highly irregular particle shapes, Celite filters out the most minute solids at the fastest flow rates obtainable. Product quality goes up and production costs go down.

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For full details, write Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario. Cable address: Johnmanvil.



These photomicrographs show the range of characteristics available with Celite filter aids.

100 μ

JOHNS-MANVILLE

What makes meat red?

There is an iron-porphyrin protein compound in meat called myoglobin; about 96% protein and 4% iron-porphyrin.

In a living animal, myoglobin is normally present as oxy-myoglobin — oxygen combined with iron-porphyrin to impart a bright red pigment. In fresh cut meat, the iron-porphyrin picks up oxygen from the air to give meat the same clean, red color—the color that is so important to a shopper's eye. This is why protective wrappings for meat must not seal out all oxygen. The molecule would spontaneously change, and the myoglobin become metamyoglobin, giving the meat an undesirable brown color . . . the same appearance it would have if the meat were heated. Many plastic film producers have walked this "oxygen tightrope" in developing better sanitary packaging for the food industry. The Goodyear Tire & Rubber Company, for one, has spent countless hours of biochemical research to develop and perfect Pliofilm®—a clear, strong plastic film that controls air and moisture diffusion and is ideal for wrapping meat. This same film is used as a bread wrap, a liner for coffee bags, and in laminations for drug and dehydrated food packages.

Benzene as the solvent for the rubber hydrochloride solution from which Pliofilm is cast. USS Benzene meets the unusually

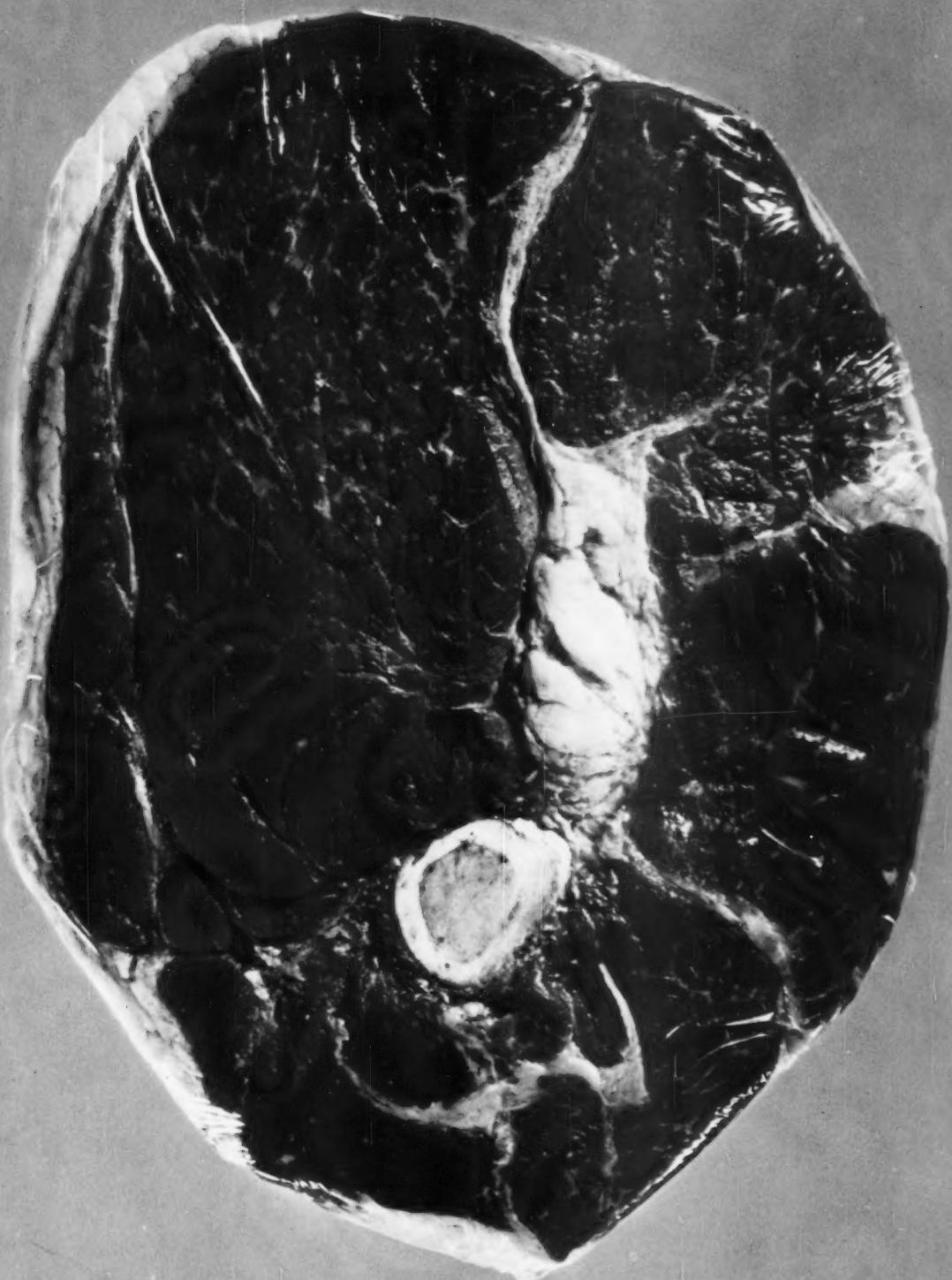
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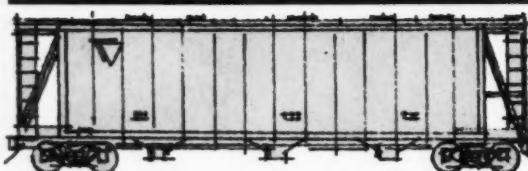
Chemicals



18

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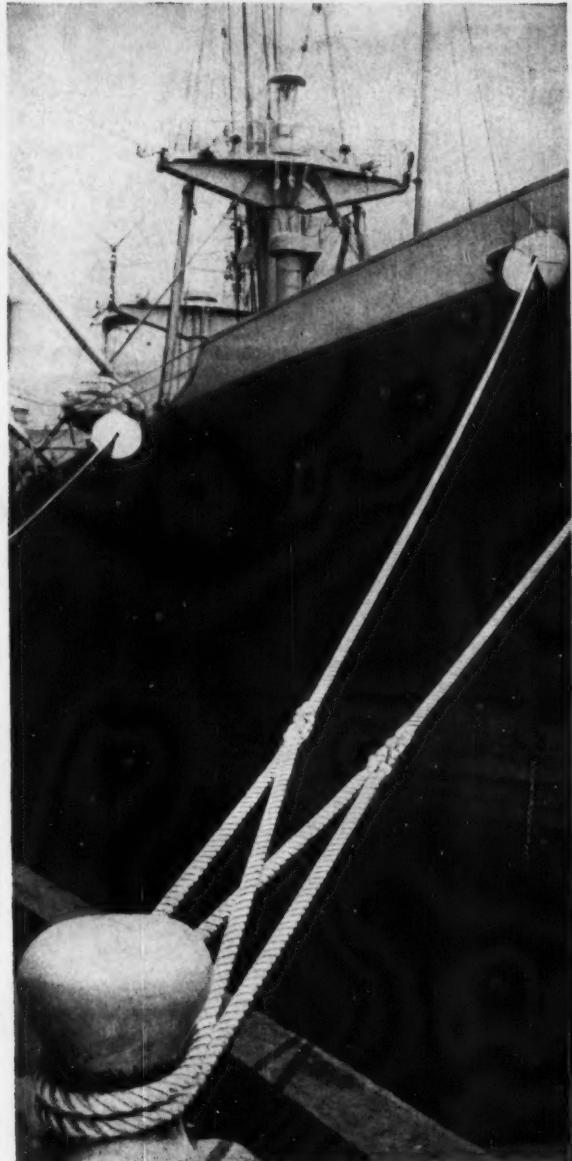


patented nozzle for pneumatic unloading.

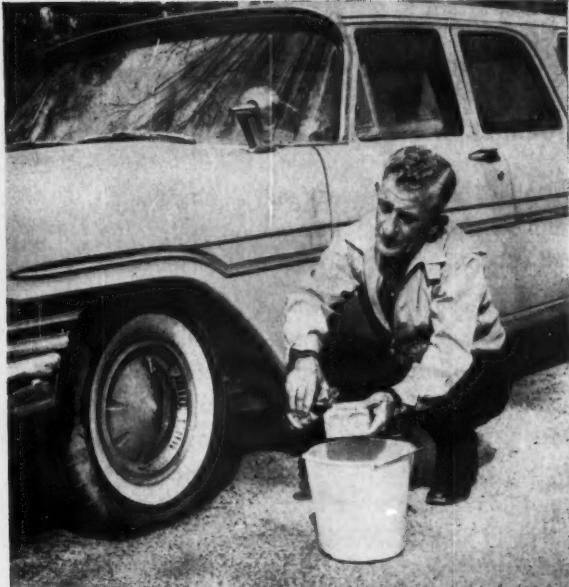
The DRY-FLO CHEM car is built with three separate compartments, each with its own nozzles and hatches. Exterior carlines—pioneered by General American—provide a smooth unbroken ceiling surface and hopper corners rounded on a 2½" radius minimize product retention inside the car.

Write for details.

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MAKE BETTER BREAD—Advances in modern chemistry help make "the staff of life" an even sturdier product. Vicrum®, Hercules vital wheat gluten, is now used in many leading specialty breads and baked goods to give better quality, improved grain and texture, longer life.

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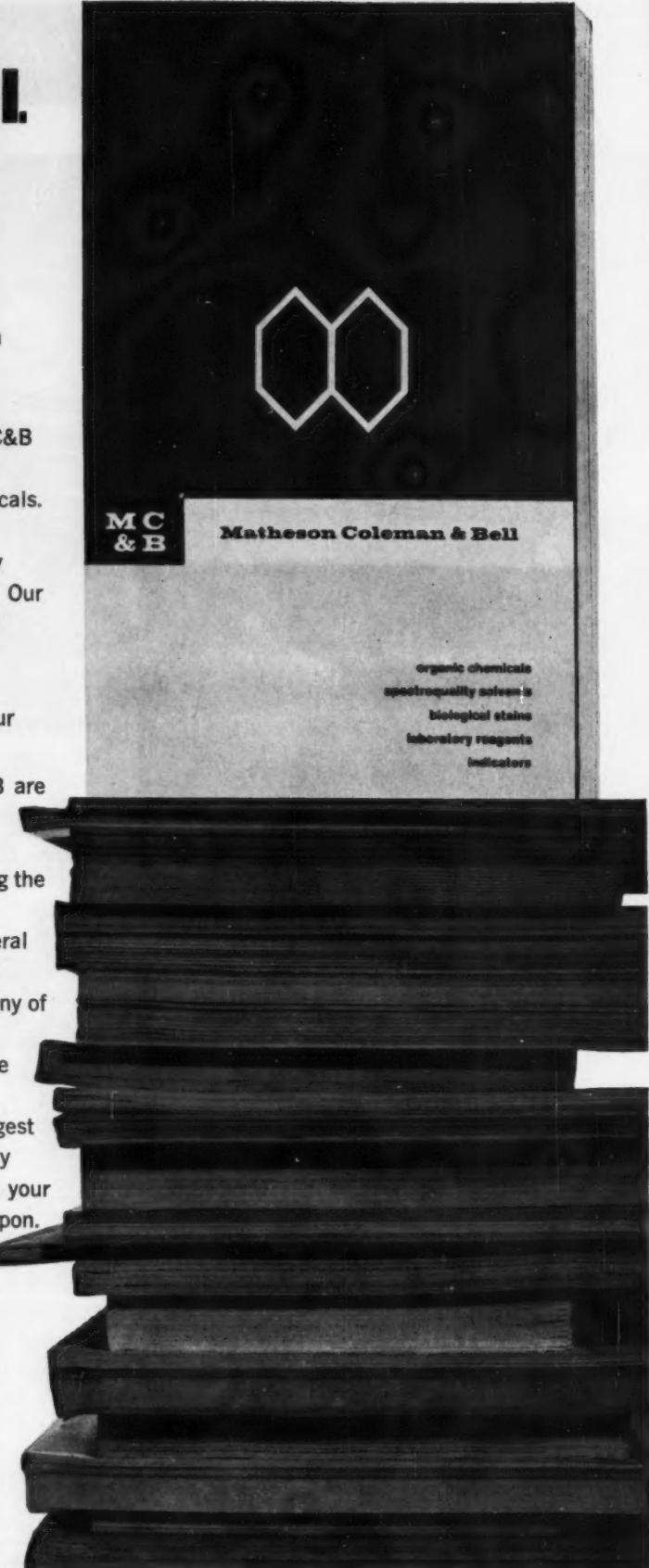
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NAPOL L—linear stereospecific polymer of anhydro-glucose units. Forms high strength gels. Oriented films are high strength, edible, transparent, abrasion resistant.

Three sites on each glucose unit available to form esters, ethers, acetals, amines. Substantive to cellulose. High reactivity with cross-linking agents.

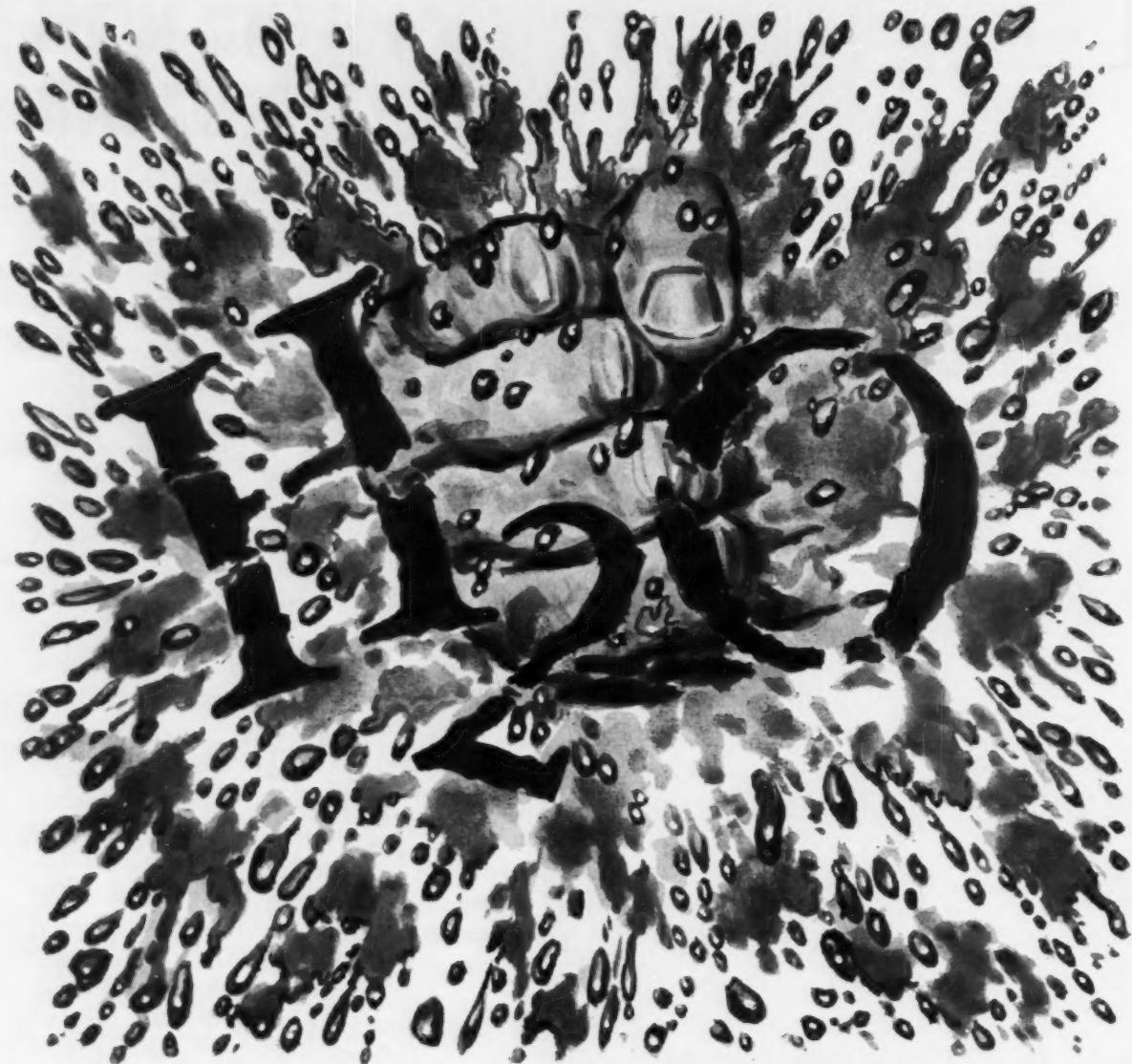
NAPOL B—branched, amorphous polymer of anhydro-glucose units. High molecular weight. Cold water soluble. High reactivity with cross-linking agents. Solutions have relatively stable viscosity.

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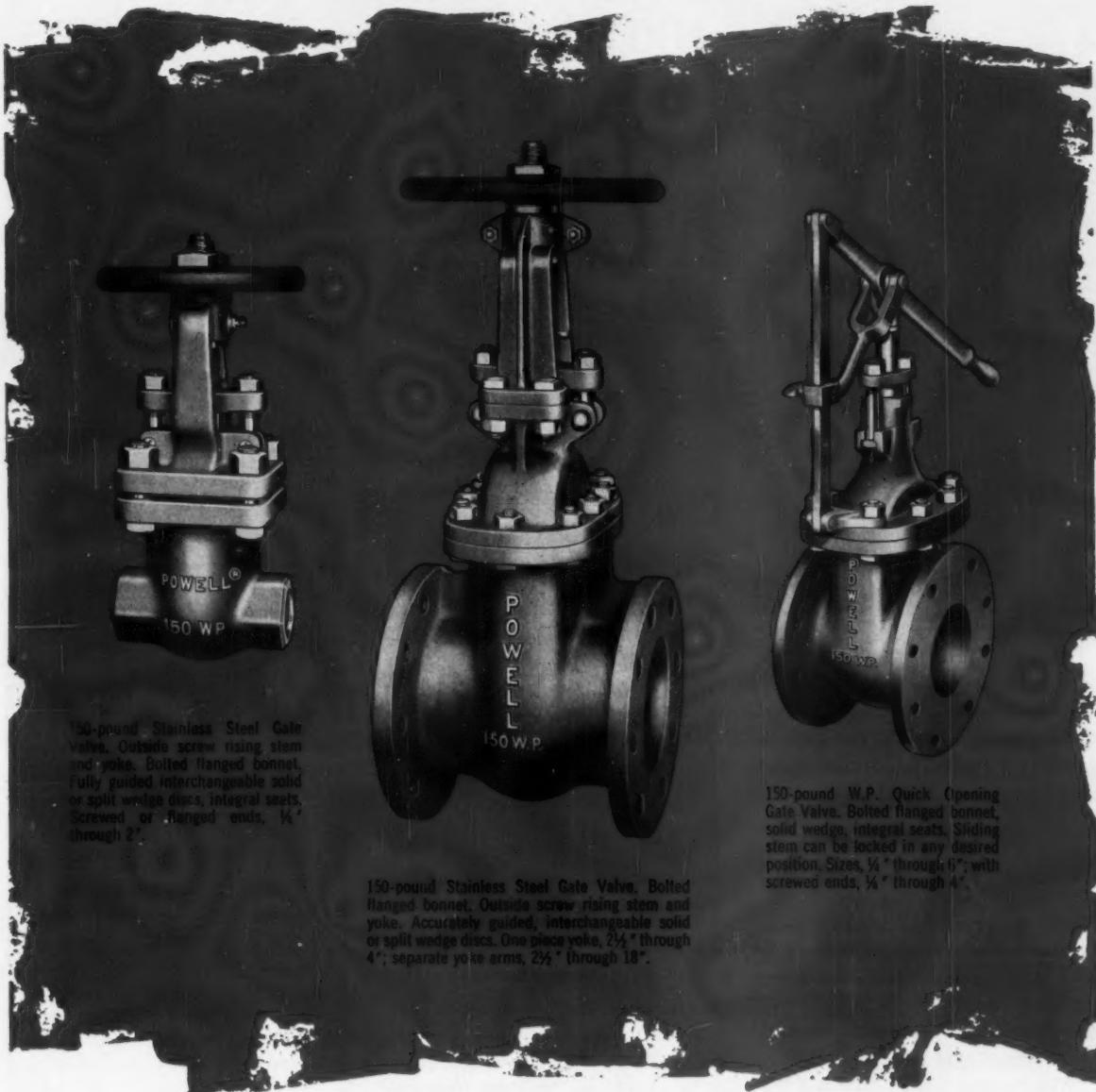
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Powell reliability starts with good design features specifically tailored for chemical installations. For example, there is a deep stuffing box for an extra amount of special packing. And valve bodies are designed with full flow areas for maximum flow conditions and minimized pressure drop. Also, wedge discs are precision machined and fully guided to eliminate drag and wear of the seating surface as well as undue vibration.

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150-pound Stainless Steel Gate Valve. Outside screw rising stem and yoke. Bolted flanged bonnet. Fully guided interchangeable solid or split wedge discs, integral seats. Screwed or flanged ends, $\frac{1}{4}$ " through 2".

150-pound Stainless Steel Gate Valve. Bolted flanged bonnet. Outside screw rising stem and yoke. Accurately guided, interchangeable solid or split wedge discs. One piece yoke, $2\frac{1}{2}$ " through 4"; separate yoke arms, $2\frac{1}{2}$ " through 18".

150-pound W.P. Quick Opening Gate Valve. Bolted flanged bonnet, solid wedge, integral seats. Sliding stem can be locked in any desired position. Sizes, $\frac{1}{4}$ " through 6"; with screwed ends, $\frac{1}{4}$ " through 4".

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How Union-Camp's 5-Star Multiwall Plan increased a pallet payload by 400 lbs...without increasing its size!

A leading supplier of high density resins* had been packing his product in 50-lb. sewn-bottom multiwalls. This gave him an efficient, 40-bag (2,000 lb.) pallet load.

When he added a *low density* resin to his line, however, he found his existing bag wouldn't accommodate 50 lbs. of the new resin due to its increased volume. A slightly larger, sewn-bottom multiwall was tried, but this reduced the pallet payload to 32 bags (1,600 lbs.). Net "loss": 400 lbs. Net result: more handling . . . more trips to the warehouse . . . higher cost.

Heightening the pallets to 10 tiers instead of 8, offered no solution—they wouldn't pass through the existing archways. To say nothing of the problem of loading trucks and trailer cars.

New bag does the trick

At this point, the 5-Star Packaging Efficiency Plan went to work. Union-Camp multiwall specialists experimented with several different bag sizes and styles. Their solution—a multiwall with a *pasted* bottom and side gussets, a *rectangular*-shaped base—and 20 per cent more capacity!

With the new design, 50 lbs. of the low density resin can now be packed in each bag. Most importantly, the pasted bottom bags can be palletized five to a tier, eight tiers to a skid for

a total payload of 2,000 lbs.—the same as the high density resins.

See your local Union-Camp man for complete details.

Warehouse space saved

The pasted-bottom bag offered several outstanding advantages. It permitted better use of warehouse space. It increased the yield per warehouseman to 1,000,000 lbs. a month. And it initiated the development of a similar design for the company's high density resins, which could increase the present pallet payload to 2,500 lbs.



Space-saving secret is in bottom of bag. New design (left) with rectangular-shaped base has 20 per cent more capacity than sewn-bottom bag (right).

Works for you five ways

Apart from bag construction and materials handling, Union-Camp's 5-Star Plan covers bag design, packaging machinery and specifications control. An improvement in any one of these areas conceivably could result in substantial savings for you. In any case, it costs nothing to find out.



2,000 pallet load of new, low density resin bags fits easily through existing doors.

FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.

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CWP-85

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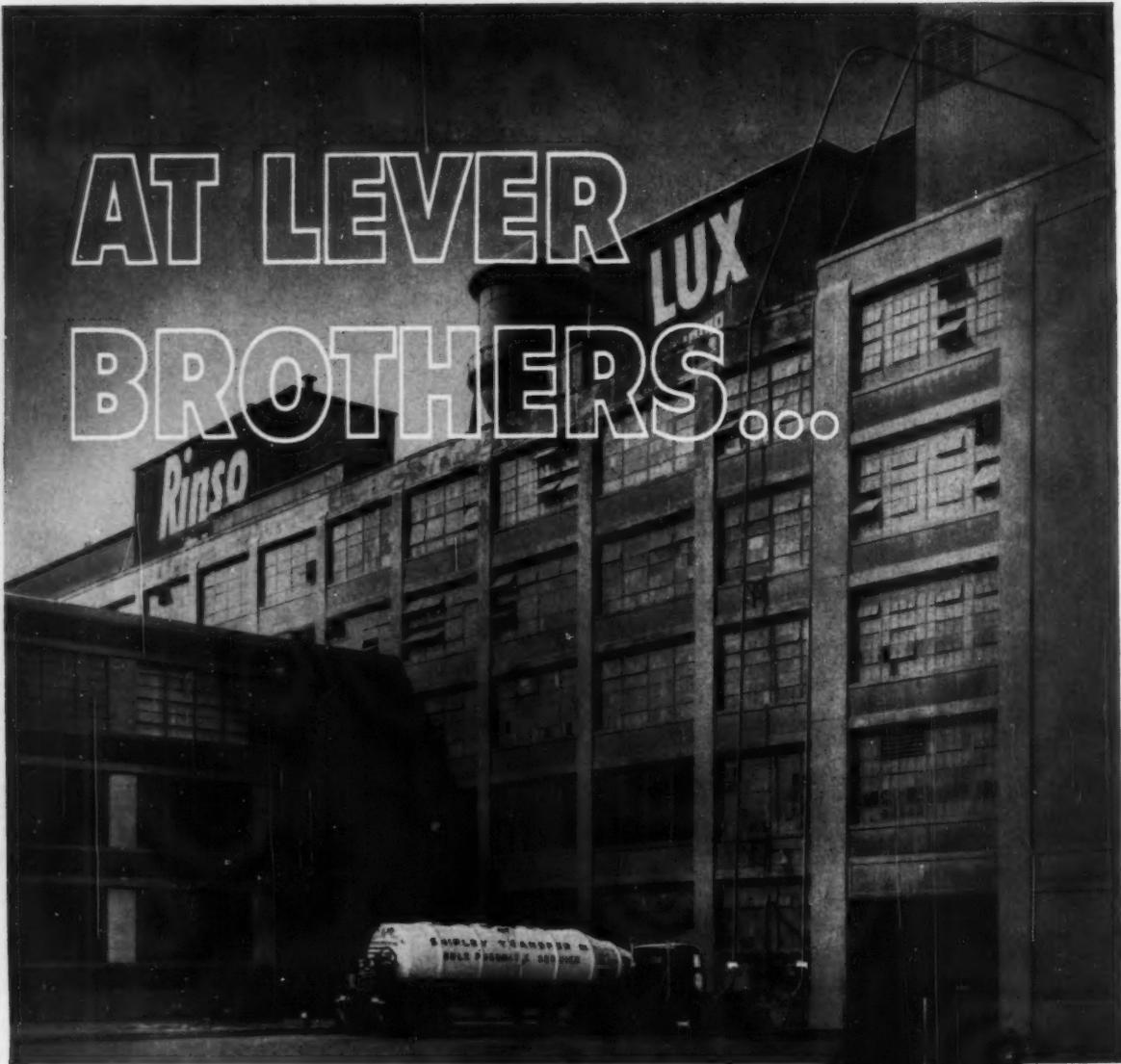
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Studies in Silicones

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Re-Tailored Molecules Fight Foam Faster— Won't Tire Out On The Shelf

Research has a "re" in it, which means "again." And UNION CARBIDE has looked again at SAG 47 Silicone Antifoam, even though we've received a flood of praise about the original product. Some of it you've seen reported here in quotes from our customers.

"Much better than competitive products for defoaming our insecticides," and "Cuts foam down in coker feed stock for 6-7 hours" are typical.

NEWS OF THE MOMENT

But the news of the moment is about SAG 47 Antifoam in an improved version possessing new qualities. We've retailed the molecules to make it fight foam even faster than before and to give it greater stability. (It's designed specially for non-aqueous systems and some aqueous ones.) And it now forms more potent synergistic mixtures with many organic defoamers than it ever did before.

Based on an entirely new manufacturing process, it is, we believe, the most efficient antifoam fluid available anywhere. Furthermore, because it does not

settle out, it exhibits greatly lengthened storage life during which its chemical composition remains unchanged.

CUTS FOAM FASTER

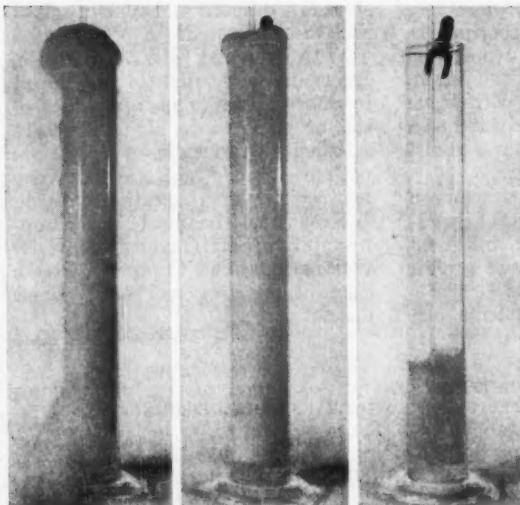
Simple, safe, non-volatile at high temperatures, and economical (often just a few parts per million are needed), the new SAG 47 can be used at full strength, or in solvent dispersion, or in a blend with one of the components that cause foaming of the fluid.

The new product can be effectively

Volume of Foam Plus Liquid (cc) After 3 Minutes Aeration		
Antifoam	Sodium Lauryl Sulfate (0.1%)	Natural* Rubber Latex (53.5%)
None	1200 in 30 seconds	
SAG 47 (New)	250	670
SAG 47 (Old)	380	850
Antifoam "X"	550	700
Antifoam "Y"	850	1000

*Antifoam concentration - 550 ppm.

Laboratory test shows how new SAG 47 outperforms other silicone antifoams



X

Y

NEW SAG 47

Photo depicts efficiency of new improved SAG 47 as shown by modified J. J. Bikerman Foam Test. Foamer is 0.5% sodium oleate. Silicone concentration is 440 ppm. Type "X" was photographed after 1½ minutes aeration, "Y" after 3 minutes, and new, improved SAG 47 after 3 minutes.

used in the manufacture of adhesives and glues; synthetic resins and polymers; cleaners, solvents, soaps and detergents; dyes, inks and pigments; drawing compounds, vegetable oils; paints, varnishes and lacquers; and in paper making and distillation.

Other uses include the making of rubber, in tanning, in finishes for textiles, in wire drawing solutions, in waxes, emulsions and anti-freeze; in plating solutions; asphalt; in evaporation and dehydration; in rendering; in galvanizing and pickling; with paper sizes and finishes; with cutting, cooling and lubricating oils; in sewage disposal; in gas absorption units; in making tallow, and in hydraulic fluids.

FREE SAMPLE AND DATA

SAG 47 is part of a complete line of silicones for preventing or reducing foam in many industrial processes . . . foam that takes up costly space, eats up manhours, often limits production capacity. We urge you to test this new SAG 47. If you've used the older one, this will work even better. For a sample of the new SAG 47, fill in and mail the coupon.



SILICONES

UNION CARBIDE, SAG, and CARBITOL are registered trade marks of Union Carbide Corporation.

Silicones Division
Union Carbide Corporation
Dept. GH-4107, 30-20 Thomson Avenue,
Long Island City 1, N. Y.

In Canada: Union Carbide Canada Ltd.,
Bakelite Division, Toronto 12.

Please send me sample and data on new
SAG 47 Silicone Antifoam.

NAME _____

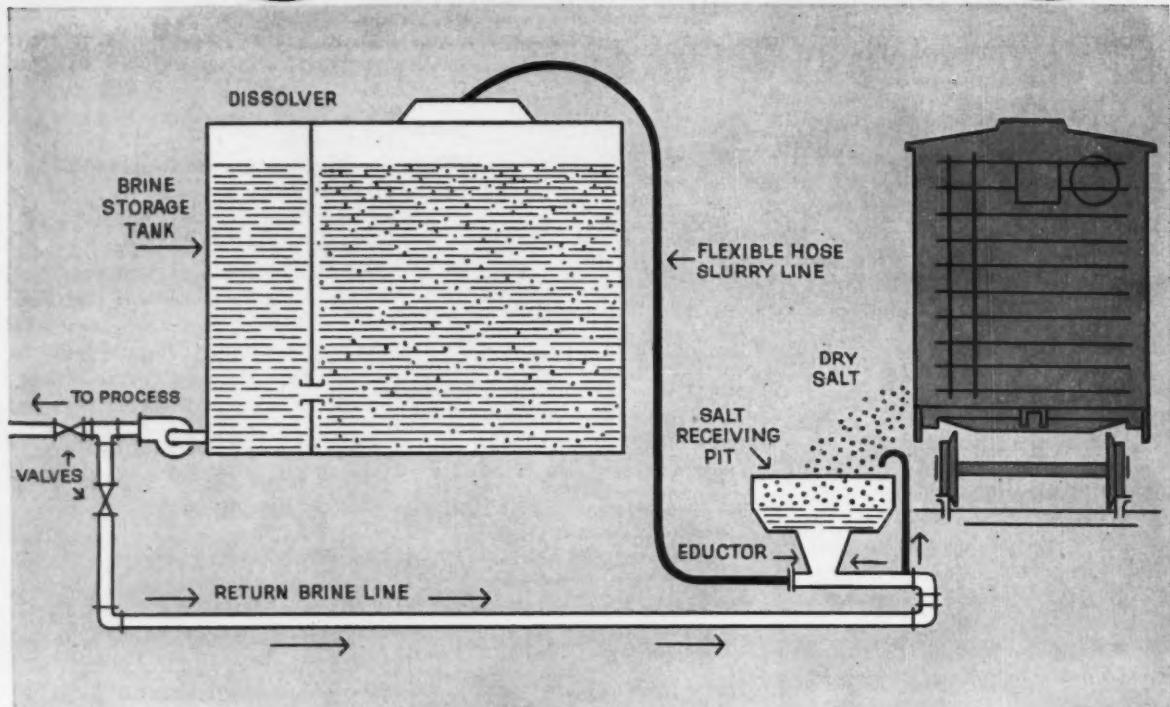
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salt engineering



New hydraulic salt-handling system pays for itself in one year

A food-specialties manufacturer used to buy evaporated salt in bags. They used a batch mixing process to combine the salt with other ingredients to produce a patented product. Lugging the salt from boxcar to the plant, storing it, then dumping into mixing vats was time-consuming, expensive and took up valuable warehouse space.

In an effort to speed up and economize on the operation, this manufacturer called in an International Salt Company Technical Service Representative. He recommended simplifying the mixing process by installing a Storage Brinomat® Dissolver outside the plant. The Dissolver automatically supplies sparkling, pure brine to the process *continuously*.

He also recommended buying less expensive bulk salt by the carload and delivering it to the Dissolver by a hydraulic handling system. In this

system, designed by International's Technical Service Department (see diagram above), a power scoop pushes salt from the cars into a receiving hopper feeding an eductor system. There the salt is mixed with brine from the Dissolver and educted as a slurry of saturated brine and undissolved salt to the Dissolver.

Efficiency and economy have been remarkable. After one year of operation the plant manager informed International that the entire system had already paid for itself!

Hydraulic handling systems can

be designed to unload, move and store any amount and type of salt—rock or evaporated.

With over fifty years' experience, International is uniquely equipped to offer assistance on all phases of salt or brine usage. Even if you're satisfied with your present operation, perhaps it *could* be improved. Why not review your operation with an International Technical Service Representative? Salt is his business. Write International Salt Company, Clarks Summit, Pa., or call our nearest district office.

*Registered T.M. International Salt Company

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To obtain a light color in any product, it is easier to start with white or colorless basic ingredients. It's costly and often impossible to remove color later. Emery gives you the colorless raw materials you need.—Emersol® 233 LL Oleic Acid and Emersol 221 Low Titer White Oleic Acid.

When you start with colorlessness, you can add as little or as much color as you wish. And the remarkable color

stability of Emersol Oleic Acids, as assured by product specifications, minimizes color changes during processing and throughout shelf life. If the oleic acid you are now using cannot meet these specifications, why not let us send you samples that can, time after time? It costs you no more for this extra quality.

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A little extra everything except price

COLOR SPECIFICATIONS	Maximum Color		Maximum Color Stability	
	Photo. Index	Lovibond 5 1/4" (Y/R)	Photo. Index	Lovibond 5 1/4" (Y/R)
Emersol 233 LL Oleic Acid	11/0.5	3/0.5	32/4.5	10/3
Emersol 221 Low Titer White Oleic Acid	15/0.5	5.0/0.5	51/10.5	20/7

FATTY ACID DIVISION

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio • Vopcolene Division, Los Angeles, Calif. • Emery Industries (Canada) Ltd., London, Ontario • Export Division, Cincinnati

FLUIDICS AT WORK



In the foreground is the newest of four Permutit Precipitators at Eastman Kodak's Lake Water Works on Lake Ontario near Rochester, N.Y.

HOW KODAK TURNS 24 MGD OF ITS LAKE WATER REQUIREMENTS INTO PURE WATER FOR CRITICAL USES

■ Row a mile and a half due north from this water plant. Dive 55 feet. You're at the intake end of Eastman Kodak Company's water system.

Travel six miles inland. You're at the Kodak Park Works, where the same water goes into critical manufacture of such quality products as photographic film, paper, and chemicals.

How this raw water, gulped from the lake in such great volume, quickly and economically turns into pure process water is the story behind our picture above.

Heart of the water system: precipitation

Kodak treats this water in three steps: (1) chemicals, (2) precipitation, (3) rapid sand filtration. The heart of the

system is the removal of turbidity and color by precipitation, accomplished with four Permutit Precipitators.

One-hour detention time: savings in space, chemicals

Detention as short as one hour is possible with the Permutit Precipitator — as against two to four hours required in old-method lime treatment and coagulation plants. This higher throughput can save as much as 50% in space to handle a given volume of water.

Savings in chemicals and adsorbents can vary from 10% to 50%. Example: a given amount of coagulant removes

more turbidity, color and algae in the Precipitator, because of the action of the suspended sludge in the mixing zone combined with the upward flow sludge filtration.

20-Page bulletin explains

Like Kodak, you may be faced with a need for big-volume, high-purity water. For full details on the Permutit Precipitator, write for our 20-page Bulletin 2204C. No obligation. Permutit Division, Dept. CW-71, Pfaudler Permutit Inc., 50 W. 44th St., New York 36, N.Y. (In Canada contact the Permutit Company of Canada, Toronto.)



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55 Gal. Drum	100	Amorphous Powder	14.00
55 Gal. Drum 10 drums	1,000	Amorphous Powder	13.00
55 Gal. Drums 50 drums	5,000	Amorphous Powder	11.75
Tank Car 8,000 gals.	11,200	SWS	7.50
Tank Wagon 3,000 gals.	4,200	SWS	11.00
Truck Load 50 drums	3,600	SWS	11.50
55 Gal. Drum 1 drum	72	SWS	13.00
55 Gal. Drums 10 drums	720	SWS	12.50

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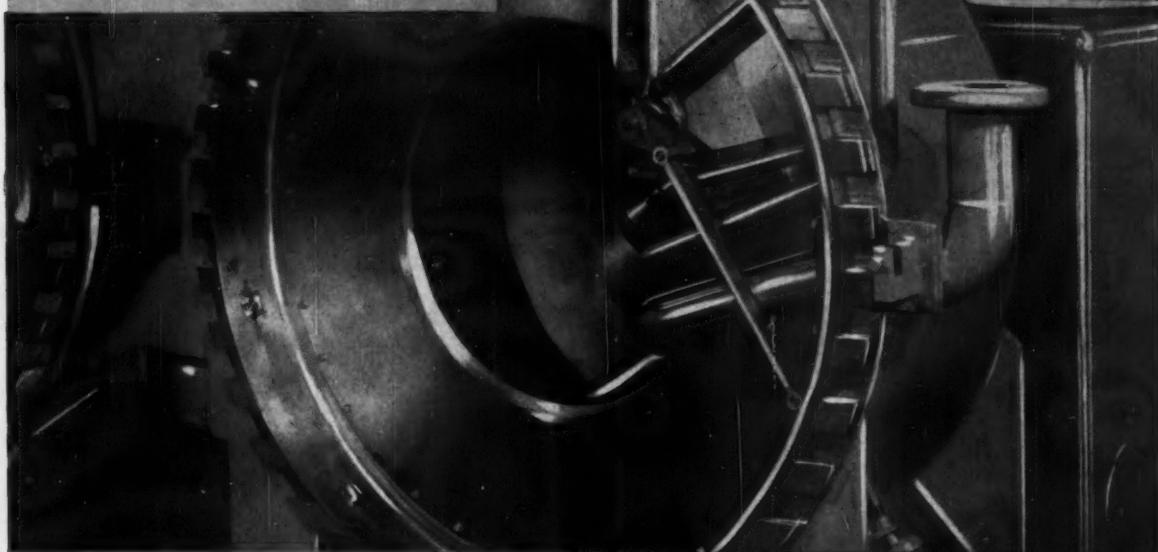
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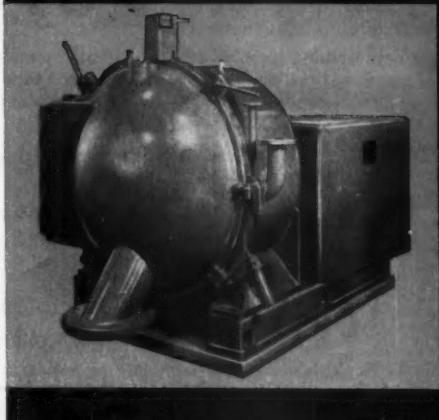
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the HS 40 W B-P PRESSURE CENTRIFUGAL

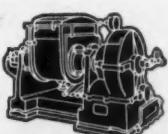
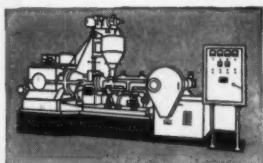
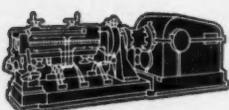


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Business Newsletter

CHEMICAL WEEK
August 5, 1961

Hot stock fight over. Late last week, Commercial Solvents sold its substantial holdings in Chemical Process Co. (Redwood City, Calif.) to its victorious adversary, Diamond Alkali. Price: \$15/share. CSC had been working for weeks to gain control of the West Coast company in an effort to block a projected CP-Diamond merger (*CW Business Newsletters, May 27, June 17*).

Raymond Evans, Diamond chairman and president, says his company now owns over 80% of the 766,650 shares of CP outstanding and is in the market for the remaining shares at the same \$15 price.

Chemical Process stockholders presumably, will vote on the proposed merger at a special meeting, Aug. 15, that was set before the CSC-Diamond donnybrook developed. If okayed, the merger reportedly will become effective Aug. 31.

Meanwhile, Diamond has called a meeting of its own shareholders for Aug. 15, to vote on the board-approved merger of Diamond with Bessemer Limestone & Cement. The deal, said to involve some \$27 million worth of new \$4 preferred Diamond stock for the 796,494 shares of Bessemer outstanding, was proposed months ago (*CW Business Newsletter, Apr. 22*).

A new vinyl acetate monomer plant is slated for the Gulf Coast. National Starch and Chemical, big in acetate polymers and copolymers, will spend some \$4 million for a 45-million-lbs./year unit to be built by Brown and Root. Construction will begin late this year, with completion scheduled for the fall of '62.

The company is considering one of two sites in Texas, and indicates that the site will tie in with raw material supplies (acetylene and acetic acid) for the plant.

Trade observers in the Houston area are having a field day speculating on National Starch's eventual choice. Among the possibilities mentioned: Tenneco as an acetylene source with land for sale; ditto for Diamond Alkali at Deer Park, and Phillips Chemical, with a small amount of acetylene available from its ethylene operations at Sweeny and plenty of land for sale. Another plant site possibility for the upcoming National Starch acetate monomer installation is Baytown, Tex.—close to site at which Air Products is said to be considering construction of an oxygen plant that would make acetylene production by Humble Oil (at the Baytown refinery) a possibility.

Acquisition of Southern Oxygen by Air Products was approved by shareholders of each company at special meetings late last week. The merger, under which Southern Oxygen will continue to operate under its own name but as a division, becomes effective this week.

Business Newsletter

(Continued)

In addition, the Air Products stockholders okayed a proposal that merges the parent company (incorporated in Michigan) into its wholly owned subsidiary Air Products and Chemicals (Delaware). This probably presages additional moves into chemicals to follow the recent joint oxo chemicals venture with Tidewater Oil (*CW Business Newsletter*, April 29). One likely field: commercial fluorine chemicals.

Air Products sales and earnings, incidentally, are bouncing upward at a fast clip. Latest nine-month figures (for the fiscal year ending Sept. 30), for example, indicate sales of \$41,283,000 vs. \$37,440,000 in the comparable period last year. This year's earnings to date were \$2,332,000, higher than any previous 12-month period.

Joint phenol venture out? The much-discussed Allied Chemical-Georgia Pacific joint phenol project at Coos Bay, Ore. (*CW Business Newsletter*, July 29), is probably dead.

But this doesn't rule out the likelihood of Allied putting up a West Coast phenol plant on its own. The company is currently studying this and other possible chemical projects (including phthalic anhydride) for that section of the country.

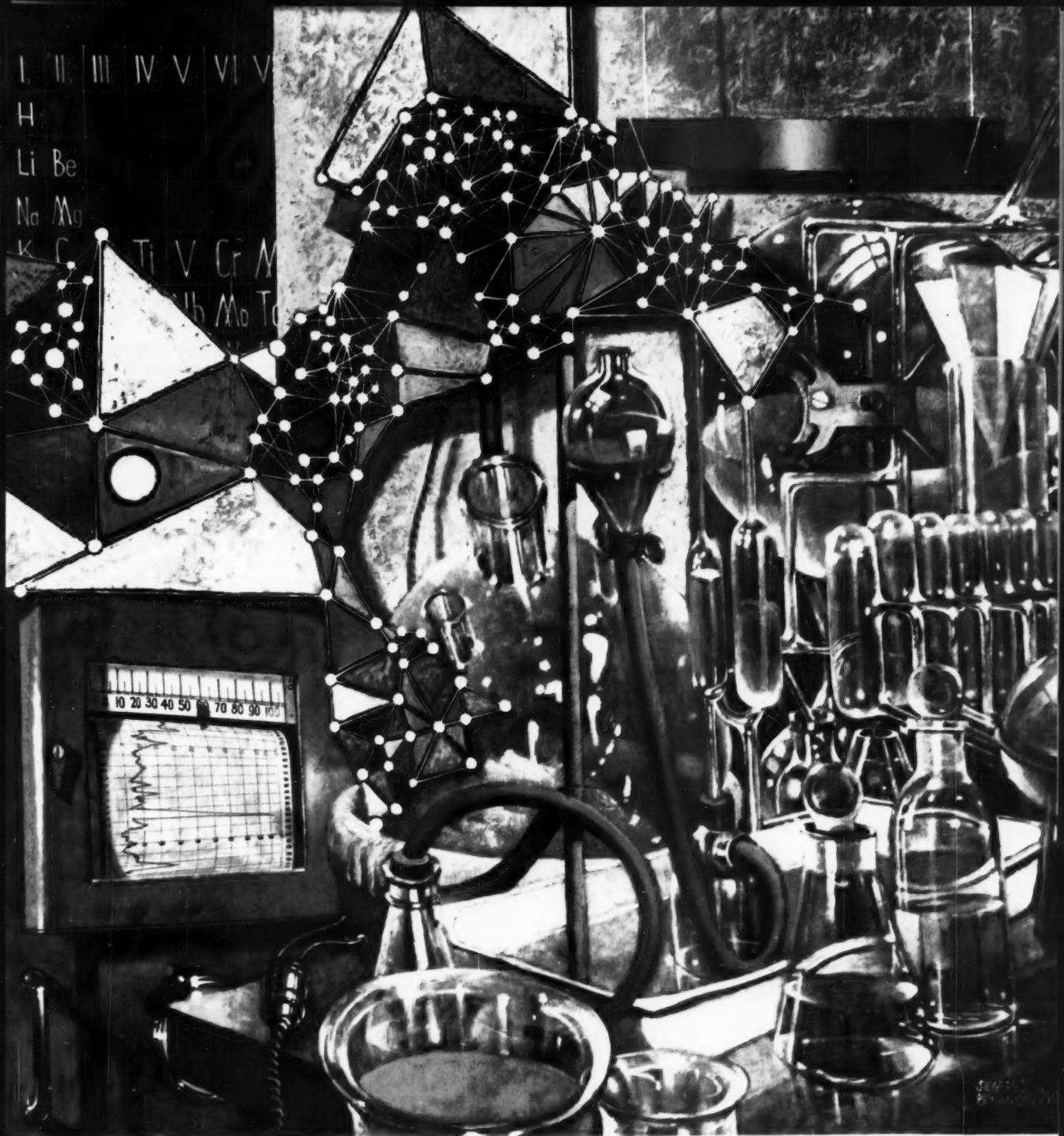
A king-size ethylene plant will be built by Gulf Oil in Harris County, Texas. Although precise site of the projected 400-million-lbs./year unit has not been disclosed, Gulf reportedly has taken an option on 1,000 acres of land in the Trinity Bay area, about 30 miles east of Houston.

The ethylene complex, slated to be completed by mid-'63, will also turn out high-purity propylene and other petrochemical products. Feedstock (ethane and propane) will come from natural gas processing plants in western Texas.

Another potash development in southeast Utah. Continental Oil (Houston) now has potash rights on an 8,000-acre tract near the 30,000-acre stretch recently farmed out to San Jacinto Petroleum, a Conoco subsidiary (*see also p. 50*).

Britain is moving toward European Common Market participation. It's looking for the right concessions (*CW Business Newsletter*, July 29), is asking the bloc's six members to open membership negotiations right away.

Negotiations will likely be drawn out—and could be unsuccessful. Knottiest problem: reconciling Britain's agricultural support system and preferential purchasing of farm and other goods from Commonwealth partners with the farm price support policies and goals of the Common Market members. The bloc would like to dispose of a greater share of its surplus in Britain. In addition, Britain is committed to safeguarding the interests of its European Free Trade Assn. (EFTA) partners.



"Laboratory Chemicals," one of a series of six paintings created by Siegfried Reinhardt interpreting important industries and professions served by Mallinckrodt.



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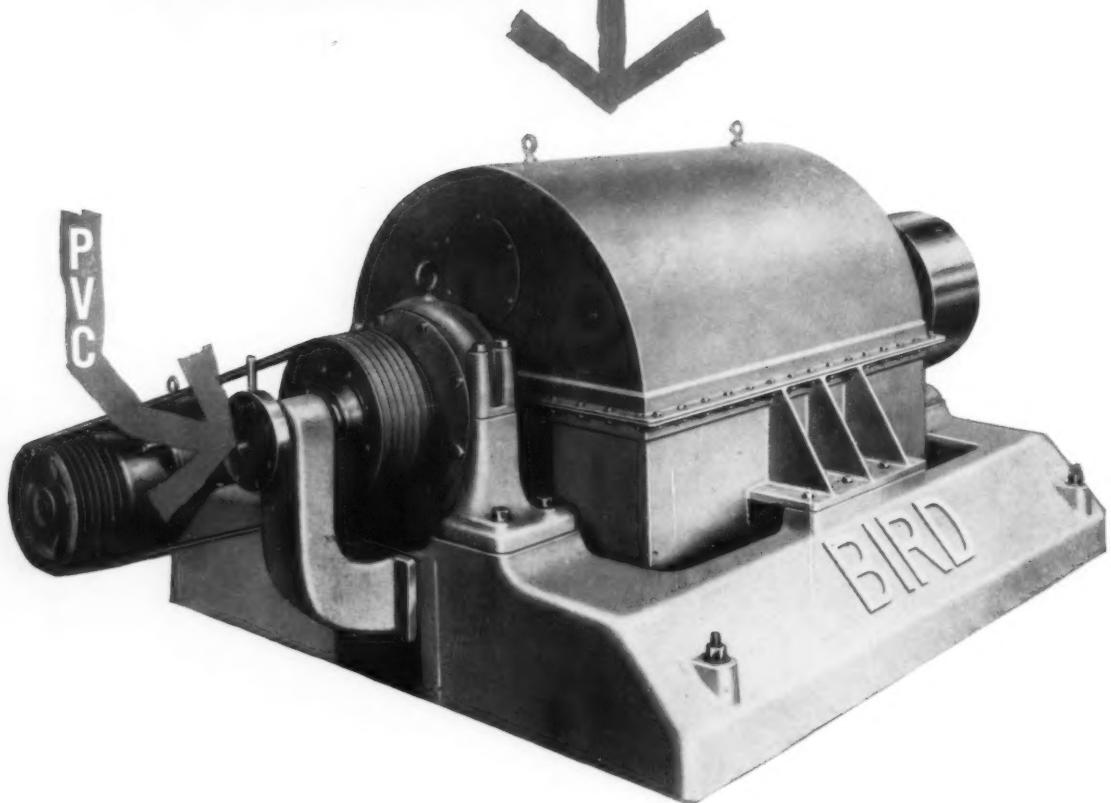
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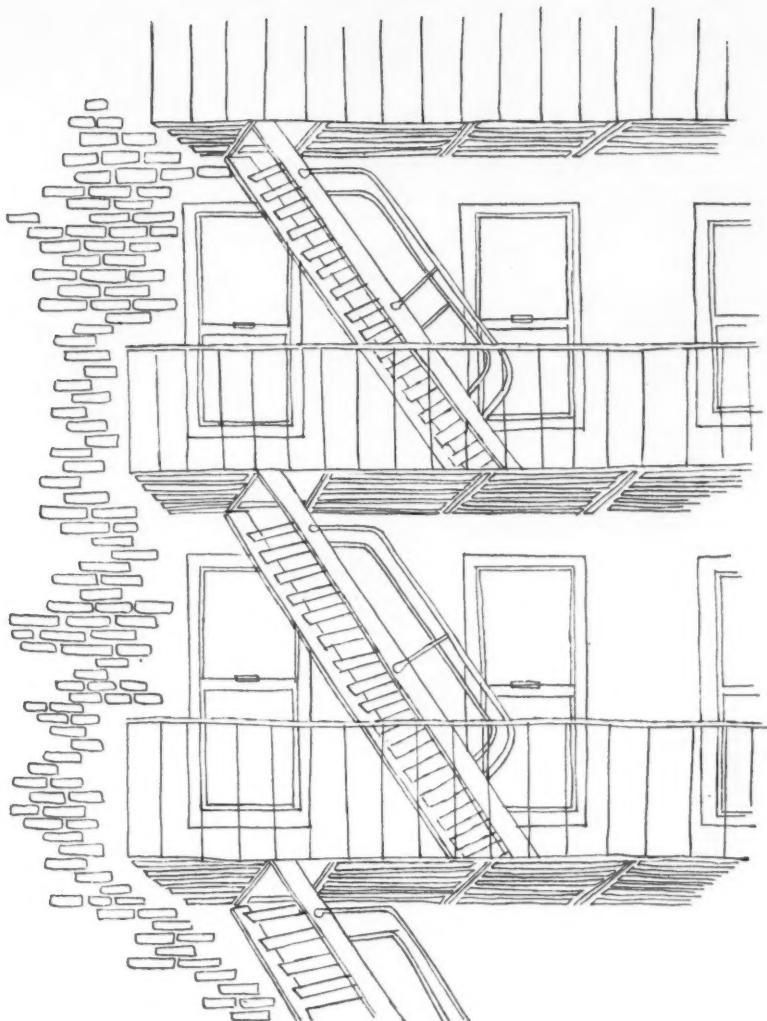
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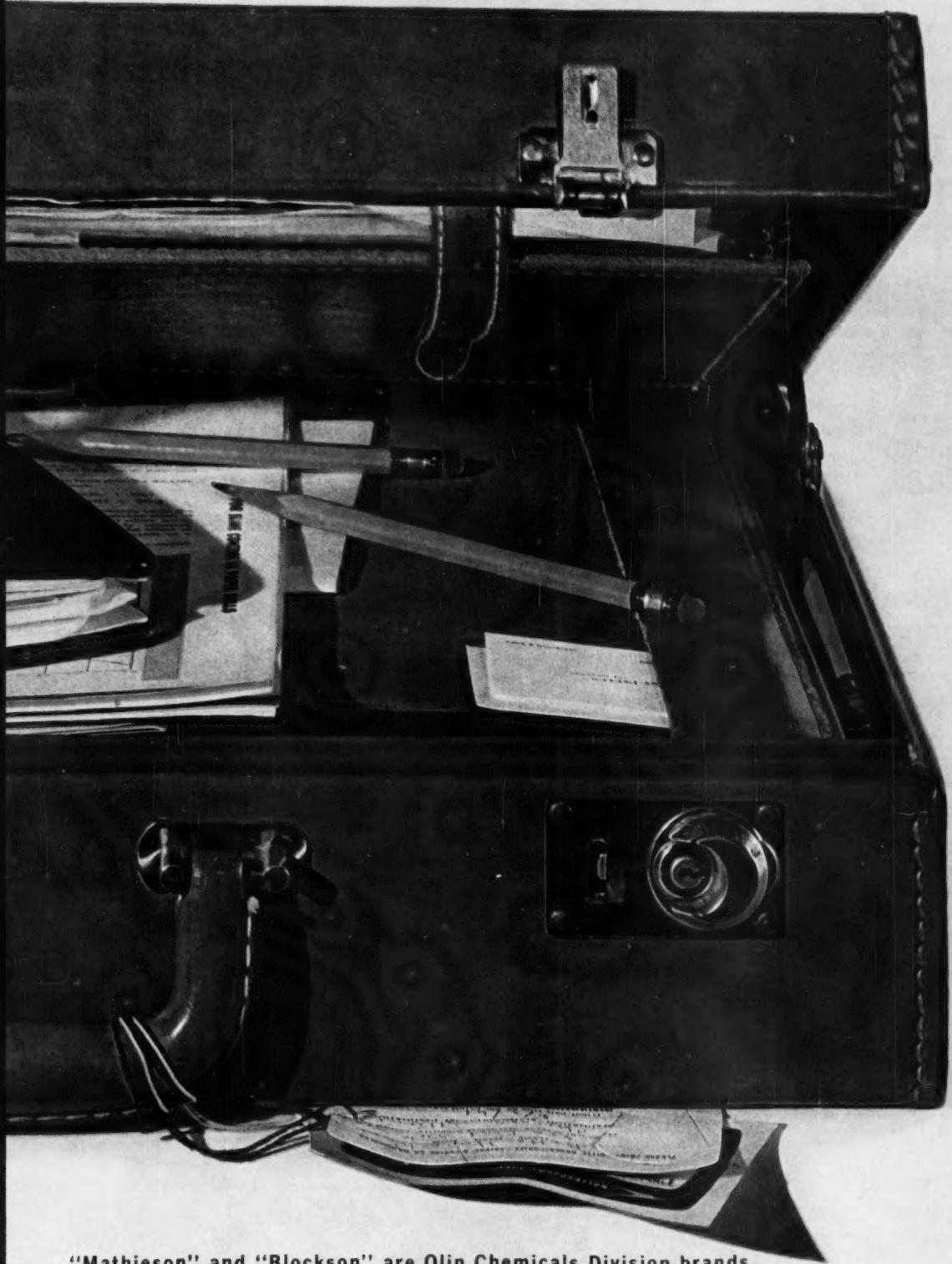


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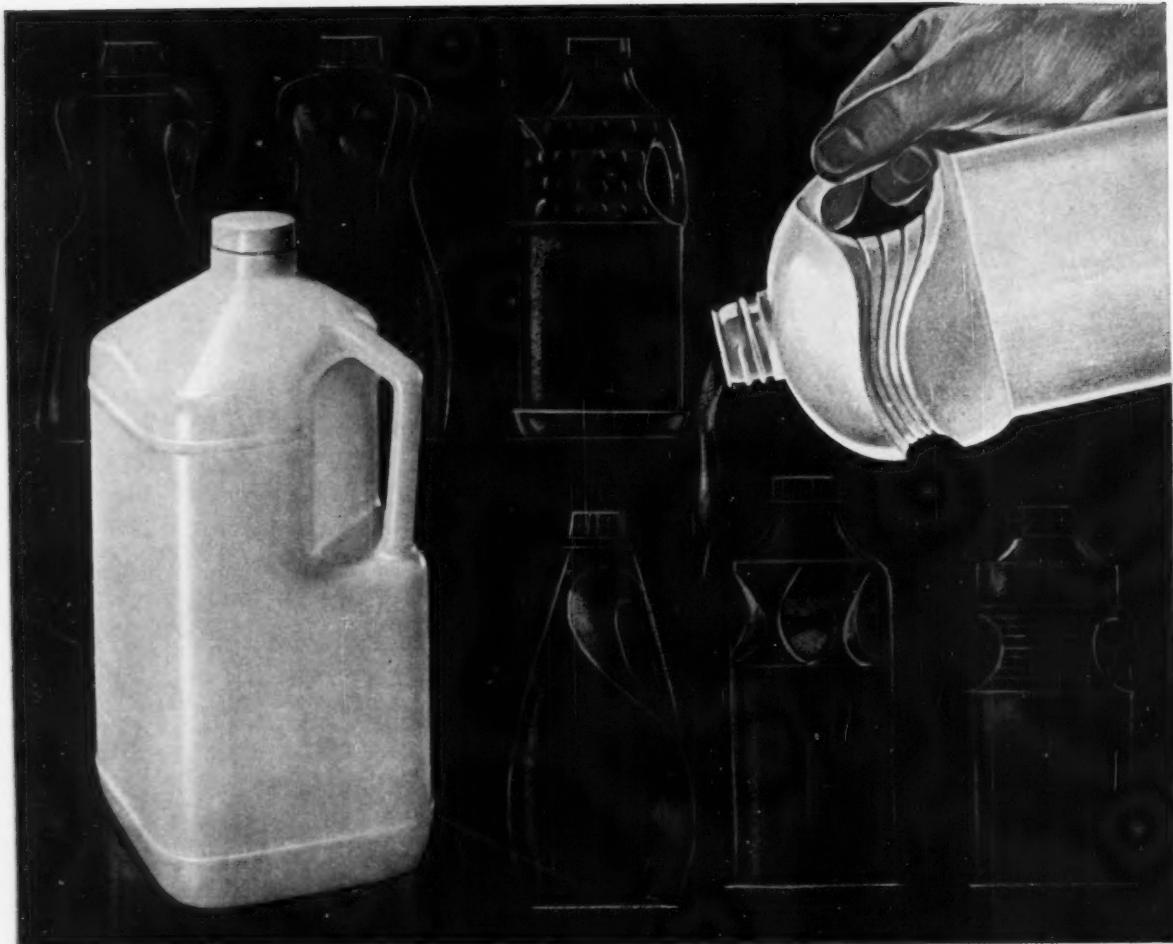
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CHEMICALS DIVISION

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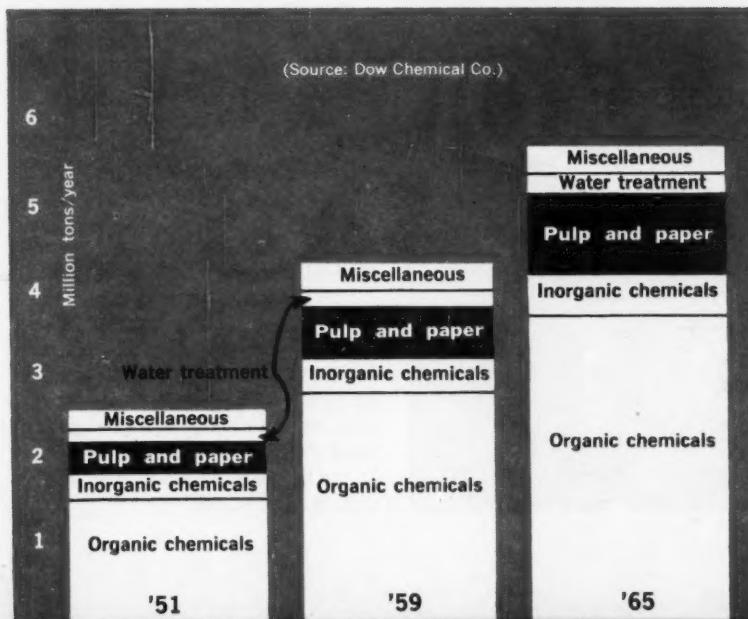
GENERAL OFFICES • TOLEDO 1, OHIO
PACIFIC COAST HEADQUARTERS • SAN FRANCISCO

AUGUST 5, 1961

Mounting paper production . . .



. . . Bulks large in chlorine growth



Paper: Chlorine's White Hope

U.S. chlorine sales are now very little below the all-time high set last year. In fact, some areas, such as Boston, have experienced shortages recently, with a resulting price rise of \$3-4/drum. But chlorine makers nevertheless are concerned about the future: no single big new outlet is on the horizon; a method of directly chlorinating hydrocarbons with hydrochloric acid could cut sharply into their market; their fastest-growing customer—paper—may well slump; and caustic soda — co-product of chlorine manufacture—may soon be in oversupply.

Paper Prospects: The most encouraging sign right now is the continuing expansion by the pulp and paper industry.

Most of the pulp and paper manufacturing growth is in the Southeast, which accounts for major chlorine expansions in that area. One factor in paper's fast growth as a chlorine consumer: steadily increasing demand for whiter and brighter papers, which means more chlorine bleach per ton of paper. Paper growth is cyclical, however, will increase 2-3% this year, probably about 5% in '62, more slowly for the next year or so.

By '65, more merchant chlorine will likely go to paper than to chemicals. Most new chlorine capacity coming on now, however, is captive, reflects fast-growing chemical demand —e.g., for polyvinyl chloride plastics, new insecticides, tetrathyl and tetramethyl lead, etc.

Running High: Latest figures show that the U.S. chlorine industry was operating at 88% of capacity in May. At 12,865 tons/day, this was close to the industry's all-time high production rate (12,997 tons/day in April '60), and up nearly 1,000 tons/day from the industry's economic

doldrums of December and January.

Growth Levels Off: Part of this rise is seasonal—chlorine always sells better in the summer when more water must be purified, more insecticides must be made. But the rise also reflects steady long-range growth. This growth, however, is slowing; it's estimated that production will expand 5.7%/year for the next few years, vs. 9.4% during the past decade and a historical rate of 11% annually (*chart, below*). But, confident that as long as the population and the chemical industry continue to expand there will be a need for more chlorine, chlorine makers are putting in new capacity.

Some of the biggest projects now under construction are Olin Mathieson's Charleston, Tenn., plant (180 tons/day); General Aniline & Film's Linden, N.J., expansion (to a total of 230 tons/day); and a big expansion of Dow's Plaquemine, La., plant (including, trade sources say, a switch to Solvay mercury cells).

And some industry men say that Hooker Chemical has just about decided to build a sizable chlorine-caustic plant at Madison, Wis., favoring that site over the new Dresden Industrial Park near Morris, Ill. Hooker denies this report.

Hooker now finds that it will not meet the Aug. 1 target date for opening its new \$10-million, 100-tons/day (estimated) Niagara Falls, N.Y.,

plant. The opening will probably be delayed at least a month; under terms of its power contract, a month's fixed electric bill must be paid if the plant is operated at all.

At the same time, one producer is leaving the chlorine field. U.S. Industrial Chemicals will cease operating the government-owned plant at Huntsville, Ala., when its contract is up Dec. 1, and Stauffer will take over. The changeover will put Stauffer into the Southeastern market—currently the fastest growing in the U.S.—and take USI out of a plant it no longer needs. USI had used the Huntsville chlorine captively to feed its ethyl chloride plant at Tuscola, Ill. It has since found ready supplies of hydrochloric acid, a step it had to go through anyway.

Hydrochloric Threat: Hydrochloric, a by-product of hydrocarbon chlorination (a fast-growing chlorine use) is in surplus supply now. Most who find the hard-to-store chemical pouring from their chlorination processes are busily trying to find something to do with it—probably none more so than Dow and Du Pont, both large chlorine users. (Although Dow is generally acknowledged to be the country's largest chlorine producer, it still buys to fill its needs).

Some of these attempts could dramatically change the chlorine marketing situation. For example, reliable industry sources say that Du Pont is

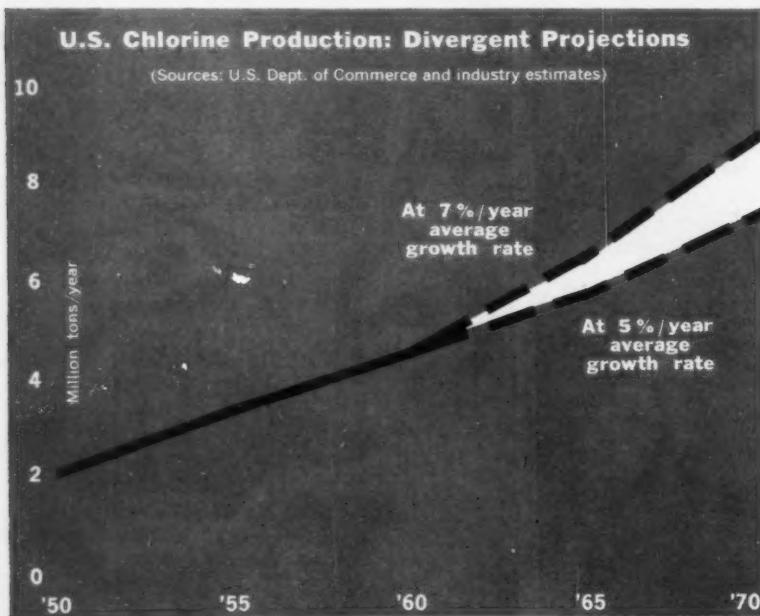
now operating a pilot plant at Orange, Tex., using HCl directly (with natural gas and oxygen) to chlorinate methane. Chief problem: corrosion, caused by the by-product water.

If the corrosion problem is licked, the company will be able to use its by-product HCl, instead of trying to peddle it to an inadequate market. Such a step could cut substantially into chlorine demand. If carried far enough, it could result in chlorine overcapacity and a profit problem in an already low-profit (about 5%) business. It could even turn the tables, make caustic—now the problem co-product of the electrolytic process—the primary factor in deciding when and where a plant will be built.

Caustic Tension: Caustic sales in most areas are now in fair balance with chlorine sales. But caustic is a worry. On the Gulf Coast, for example, it is anticipated that any further increase in chlorine making would create a caustic surplus. On the West Coast caustic is already in surplus. Caustic is much easier to store than chlorine, however, so this is not the problem it would be if there were a cutback in chlorine production—due, say, to a new direct HCl chlorination process. Since about 10% more (by weight) caustic than chlorine is produced by the electrolytic process, and caustic is nearly in balance, this could lead to a caustic shortage.

One other big market—water treatment—is running a number of producers into trouble with governments, national, state, and local. Incensed by identical bids for government chlorine purchases, many law enforcement people have begun to cry "price-fixing." Several companies have already been prosecuted with some resulting convictions (*CW, May 6, p. 37*). Industry people answer that the commodity offers too little profit, processes are nearly identical and yield products that are too similar for anyone to dare charge a price different from his competitor's.

"I can't see why bids aren't identical all the time," says one producer. He sees the price situation as one more reflection of a product having an extremely stable market. Most agree that chlorine moves almost exactly as chemical production moves. Most experts now feel perfectly safe in predicting U.S. production of 5.7 million tons in '65.



Borden Chemical: Growing at Both Ends of Product Spectrum

Primary chemicals and intermediates	Synthetic resins	Specialty chemicals and end products
Formaldehyde	Polyvinyl acetate	Adhesives, cements, glues
Methyl acetate	Polyvinyl alcohol	Coatings
Hexamethylene tetramine	Polyvinyl chloride	PVC plastic extrusions, insulation, tubing, tapes
Caseins	Polystyrene	
Acquisitions and New Products Being Added in '61		Acquisitions and New Products Being Added in '61
Acetylene	Monochem	Commercial Ink and Lacquer Co.
Vinyl Chloride	{ (50%-owned)	Hawley-Monk Co. (inks, other graphic arts materials)
Vinyl Acetate		Columbus Coated Fabrics Corp. (plastic-coated fabrics, PVC film, PVC coatings)
Methanol		

Borden: Integrating Both Ways from PVC

Borden Chemical Co. vaulted into the \$100-million/year-sales* category last week when its parent organization, The Borden Co. (New York), acquired the \$34-million/year business of Columbus Coated Fabrics Corp. (Columbus, O.) Terms: issue of 525,800 shares of Borden stock — current market value \$33.2 million — in exchange for all Columbus stock.

This was Borden's third and largest chemical acquisition this year, following the purchase of two producers of special printing inks and related products for the graphic arts industries (*CW*, March, 11, p. 26). Meanwhile, Borden is also integrating in the other direction by building plants at Geismar, La., to produce basic chemicals and intermediates (*CW*, June 24, p. 43).

The newest acquisition was formalized by Presidents Augustine R. Marusi of Borden Chemical and C. Gordon Jelliffe of Columbus late last week, although negotiations began early this year (*CW Business Newsletter*, Feb. 11).

From Buggies to Buicks: Columbus — major producer of fabrics coated with acrylic, polyvinyl chloride, nitrocellulose and oil compounds — was founded in 1900 as a maker of horse

blankets and buggy tops.

Much of the company's growth stemmed from its success as a major supplier to the automotive industry; and that industry is believed to account for about 20% of the firm's present sales volume. It sells to all of Detroit's "big three" auto makers a variety of plastic and fabric materials for use in headlinings, door panels, kick plates, crash panels, flooring and seating trim.

Plant, office and laboratory facilities are housed in 22 buildings on a 14-acre tract in downtown Columbus; total floor space there is 409,236 sq. ft., of which 360,101 sq. ft. are used for production and related functions such as designing and printing. In addition, there is an 87,000-sq. ft. warehouse that was recently completed on a 24-acre tract in a small town six miles from the main plant.

Bidding for 'Bonded' Boom: Possibly brightest prospects for the new Borden acquisition are in its PVC coatings that are bonded to metals — a development credited largely to Jelliffe.

These coatings, tradenamed Colovin, are semi-rigid vinyl sheetings that the company says can be "permanently laminated" to steel, aluminum, magnesium and other metals. The plastic-metal laminates, Columbus

adds, can be drawn, shaped and machined, and the coatings will not rupture or discolor. Colovin laminates are already being used in autos, appliances, and other applications.

Thus Borden is acquiring a PVC-consuming subsidiary at a time when Borden is building new capacity for both vinyl monomer and polymer, and at a time when PVC prices are sadly sagging (*CW*, July 29, p. 59). It could give better balance to Borden's overall chemical operations — which will now account for about 10% of The Borden Co.'s total sales volume, and considerably more than 10% of its parent company's profits.



CW PHOTO—ED WALLOWITCH
Borden's Marusi: Acquisition lifts division sales past \$100 million.

* CW estimate, including sales of foreign subsidiaries.

Catching Up to '60 Summits

The April - May - June quarter brought wholesome sales and earnings gains — relative to the dismal January-February-March quarter that preceded it—to nearly all U.S. and Canadian chemical companies. But it brought increases over the profit peaks attained in the year-ago period to only a sprinkling of chemical producers.

With first-half financial data now tabulated by more than half of the industry's leading companies, interest centers on those concerns that managed to buck the rough-hewn trends in operating results from the early-reporting companies (*CW*, July 29, p. 13).

By and large, it was the small to medium-sized companies that were most successful in bettering profit performances of last year's record second quarter. Du Pont of Canada, for example, boosted six-month net income 8.6%, to a shade less than \$4 million, for a profit ratio of 7.4%.

Physical volume of that company's first-half shipments increased by 11%, but because of lower prices on certain principal products, dollar volume of sales climbed only 8%. These gains were generated mainly by the increased business activity in the second quarter.

Possibly the sharpest improvement from year-ago levels was realized by Catalin Corp., which operated at a net loss of \$47,908 in the first six months of '60 but came up with a \$100,025 net profit for the like period of '61. This was achieved despite a 5.8% drop in sales, to \$9.4 million.

Commercial Solvents attributes its gains to a policy of putting "major emphasis on the profitable areas of its operations"—particularly in development of new applications for nitro-paraffins and derivatives. First-half earnings rose 8.6% to \$2.8 million, even though sales decreased 5.1%, to \$32.6 million.

Vitro Corp. went even further along these lines: although sales and other revenues shrank 23.5% to \$23.3 million, first-half net income jumped 76% to \$978,365. President Frank B. Jewett, Jr., explains that the rise in earnings and drop in revenues "reflect the elimination of unprofitable operations."

Witco Chemical scored increases in

both sales and earnings. Six months' sales mounted 7%, to \$51.1 million, and net income climbed 2.7%, to nearly \$1.6 million.

Freeport Sulphur, which does not report interim sales, boosted six-month earnings 3.3% to nearly \$6.7 million, with a second-quarter increase more than offsetting a first-quarter decline.

Atlas Chemical (formerly Atlas Powder) racked up a 6% gain in second-quarter earnings, to more than \$1.2 million, with April-to-June sales up 2.6%, to \$21.1 million. Six-month sales also were up slightly, to nearly \$40.3 million; but because of the slow first-quarter, six-month earnings were down 7%, to \$2.2 million.

Some other chemical companies managed to top last year's second-quarter sales but fell short of year-ago earnings. Wyandotte Chemicals, for example, pushed April-to-June sales up 1%, to nearly \$24.6 million, but net income slipped 2.3%, to \$1.2 million. Per-share earnings, however, mounted from 79¢ one year ago to 86¢ in the latest quarter.

Stauffer Chemical boosted second-quarter sales 3%, to \$62.7 million; and six-month sales were up 3.8%, to \$118.7 million. Second-quarter earnings, at \$5.66 million, were less than 2% below the year-ago mark; but the sticky first quarter held six-month earnings to \$9.44 million, down 12.7%.

Celanese Corp. also surpassed its second-quarter '60 sales; but volume of \$71.5 million in the latest period fell short of the company's expectations of a \$74-million turnover. Net income for the second quarter was off 2.8%, to \$5.1 million. Management called the turn accurately on this count, having predicted earnings of "more than 50¢/share"; the actual figure turned out to be 52¢/share.

Olin Mathieson, Hercules Powder, Du Pont were three other "top 10" chemical companies that increased second-quarter sales totals this year. Of these three, only Hercules was able to score a gain over year-ago earnings. Olin not only topped '60 second-quarter sales by 2.5%, to \$189.8 million, but also pushed ahead in six months' sales by 0.4%, to \$349.7 million. First-half earnings were down 22.8%, to \$14.4 million; but nearly all of

that decrease came in first-quarter '61.

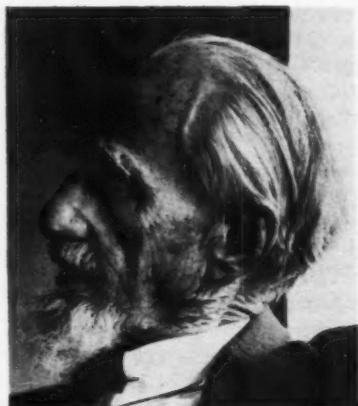
Southern Nitrogen, a young company in a booming growth period, boosted six-month sales 23%, to \$8.7 million; and raised earnings 39%, to \$2 million.

In its fiscal year ended June 30, Spencer Chemical elevated sales by nearly \$5 million, to nearly \$79.1 million, a new record for the company. Net income for the entire year was up almost 3%, to nearly \$6.9 million.

Diamond Alkali's second-quarter sales and earnings of \$35.7 million and \$2.6 million, respectively, were up more than 15% and 10% from the first-quarter lows, but fell considerably short of year-ago highs.

American Potash & Chemical's second quarter was marred by weather that reduced potash sales in the midwest. First-half sales dropped 12.7%, to \$22.8 million; earnings were off 18.3%, to \$2.1 million.

Most major drug producers reported moderate gains for the period.



CW PHOTO—M. SCHREIBER

Innovator Bows Out

John V. N. Dorr, (above) chemical engineer whose inventions have become standard processing equipment in the chemical, metallurgical and other industries, has resigned from the board of directors of Dorr-Oliver Incorporated (Stamford, Conn.)

Dorr had founded the Dorr Co.—a predecessor of Dorr-Oliver—in 1910, and served as chairman of the board for several years following the merger with Oliver United Filters in early '55. Now 89, Dorr is still active in The Dorr Foundation and Dorr Associates, and is a director of American Synthanite Corp. (New York).

Securities for Growth

Two companies added to their capitalization structures last week preparatory to launching new chemical and petrochemical ventures.

Borne Chemical Co. (Elizabeth, N.J.) applied to the Securities and Exchange Commission for registration of 100,000 new shares of capital stock that may be issued later for acquisitions or expansions. Borne has been operating at a loss for the past four years while assimilating various acquisitions, but it looks for an early return to black-in bookkeeping, based largely on three developments:

(1) A new, heavy-duty, all-purpose liquid detergent that's being produced under the trademark Wow.

(2) A new type of plastic container that can be hermetically sealed to hold food, drugs and other perishable products. Borne says these containers can be easily opened by the user and repeatedly recapped for further use.

(3) Production of acrylic plastic sheets, up to 6x8 ft., by a new method that Borne says permits production of larger sheets of superior quality and uniform thickness on a substantially reduced production cycle and with a drastic decrease in production costs (*see p. 152*).

Borne stock sold at up to \$39.50/share on the American Stock Exchange last year, but recently has been traded in the \$14-20 range. The registration statement also covers 168,965 shares being offered for the accounts of 21 principal stockholders.

Northern Natural Gas Co. (Omaha, Nebr.) sold \$35 million worth of 4½% sinking fund debentures through a syndicate headed by Blyth & Co. In part, proceeds will go toward a \$105-million expansion program that includes a \$10-million plant at Bushton, Kan., for extracting natural gas liquids for petrochemical and other applications. This plant will be owned and operated by Northern Gas Products Co., a wholly owned subsidiary that may be heading toward production of chemicals.

Another item on Northern's expansion program is a \$6-million helium extraction plant. This would be built—probably in the Texas Panhandle area—by Helex Co., another wholly owned subsidiary, which is now negotiating with the U.S. government for a long-term helium sales contract.



Miles' Beardsley: Driving to add 50% to sales volume in four years.

Counting on Chemicals

Miles Laboratories (Elkhart, Ind.) will stress greater activity in ethical drugs, fine chemicals and enzymes in its drive to attain a total sales volume of \$125 million by '65.

Right now, the company is slightly ahead of its timetable for this goal, Chairman Walter R. Beardsley and President Edward H. Beardsley told the New York Society of Security Analysts last week. Last year's sales were up 14.1%, to nearly \$82.4 million; and sales in '61 to date have been at an annual rate of more than \$88 million.

The citric acid plant has been operating at more than its designed capacity of 20 million lbs./year, Beardsley reported, and he figures this is about 20% of present U.S. production. The company now has increased its market penetration to more than 80% of the country's 200 largest citric customers.

President Howard F. Roderick of the Miles Chemical Co. division is planning to enter the citric ester and sodium citrate fields, calculating that these moves will assure sale of the full output of the citric plant, despite the scheduled startup this month of Bzura Chemical Co.'s citric plant at Fieldsboro, N.J.

This year's capital expenditures are budgeted at \$8 million, about evenly divided between domestic and foreign projects. Last year, Miles invested nearly \$6.8 million in capital additions, including \$2 million for foreign affiliates. The company's research budget is \$3.9 million—up 50% in two years.

Stepup in Desalting

The Interior Dept.'s Office of Saline Water is firming its plans for a tremendous expansion of its program to build desalting plants (CW, Washington Newsletter, July 29).

It already has hard plans to build during the next four years 12 demonstration plants, ranging in size from 250,000 gal./day to 25 million gal./day and employing 10 different processes. Total cost: \$82.6 million.

This is the schedule: \$10.9 million worth of construction in fiscal '63 for three plants; \$13.5 million for four plants in fiscal '64; \$10.8 million for three plants in fiscal '65; \$17.7 million for three plants in fiscal '66.

But OSW has its highest hopes pinned on a program of loans and grants to communities to build their own plants. Construction will be spread around the country, since every major area except the Midwest corn belt and the Pacific Northwest has run into water problems. Strongest interest has been seen in Texas, California and Florida, but there has also been keen interest in the Northeast.

More than 200 communities already have inquired into possibilities of a saline-water plant; 91 are seriously seeking such a plant. If the grant and loan programs are approved, OSW figures hundreds will apply for plants.

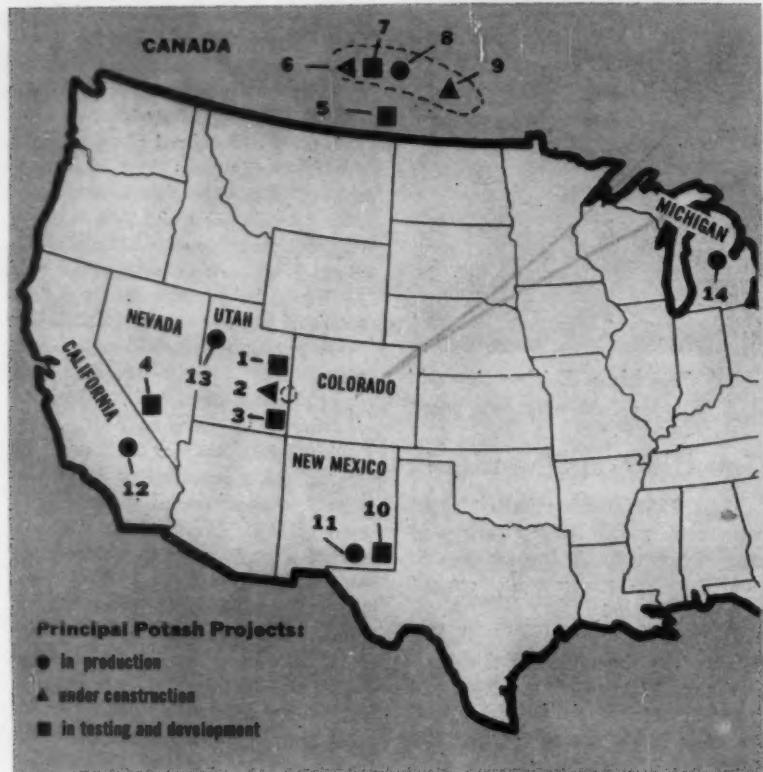
President Kennedy's plans are now before the House Interior Committee headed by Rep. Wayne Aspinall (D., Colo.), which is expected to reach some decision on them shortly. In the past, that group has been more interested in research and development than in construction of saline-water plants.

In contrast, the Senate Interior Committee, headed by Sen. Clinton Anderson (D., N.M.), has traditionally been more interested in going ahead with building.

The House group is certain to cut down Kennedy's plans, particularly for construction. The Senate committee is equally certain to try to restore some of what the House cuts out.

How much will be left when Congress gets through is questionable. But one thing is certain: Kennedy has pushed saline water into the status of a major government program, and construction of conversion plants will doubtless become a big and growing business.

Hot spots on potash map: exploring, testing, building



Stepping Up the Potash Pace

Potash prospectors in western U.S. and Canada—enthusiastic about apparently big new deposits and optimistic about production and marketing problems—are stepping up their race to commercialize their findings.

Newest developments are in the rugged mountain country of southeast Utah, where prospecting rivalry has become progressively keener.

At Salt Valley anticline (site No. 1, in map, above) Utah Potash Co. (Salt Lake City and Denver) has farmed out to San Jacinto Petroleum Corp. the federal and state potash prospecting rights it holds on more than 30,000 acres of land in Grand County. San Jacinto—an 82%-owned subsidiary of Continental Oil Co. (Houston, Tex.)—is starting “an intensive exploration program” to determine grade, reserves, and economic mining depths of the potash deposits there.

The tract being probed by San Jacinto lies about 24 miles northeast of Cane Creek anticline (site No. 2)

where Texas Gulf Sulphur Co. (New York) is building its \$30-million potash mine, mill, and shipping complex. Last week the last major contract for that project was signed and sealed. Denver & Rio Grande Western Railway awarded to Morrison-Knudsen Co. a contract—estimated by construction industry sources at about \$4 million—to build a 30.6-mile spur line from D&RGW's main line at Crescent Junction to Cane Creek.

South of the TGS holdings, Superior Oil Co. (Los Angeles) is believed to be testing out what it thinks is a major potash discovery in San Juan County (site No. 3). Numerous other companies and partnerships have been drilling under federal and state permits on both sides of the Utah-Colorado border in that area.

Another spot of interest is in the Clayton Valley-Goldfield area of southern Nevada (site No. 4), where it appears that potash is present in large quantities but mining and proc-

essing economics have not been determined. One prominent claimholder: Leprechaun Mining and Chemical Co. (Las Vegas, Nev.), which says it has 15,360 acres under lease near Silver Peak. Company President Clyde P. Kleegel tells CHEMICAL WEEK that corings there have disclosed a major brine lithium reserve containing “at least 10 million tons of potash.” Other values, he adds, include cesium and rubidium salts.

Near Moose Jaw in southern Saskatchewan (site No. 5), Standard Chemical Co.—jointly owned by Armour Chemical and Pittsburgh Plate Glass—is starting its attempt to prove the feasibility of solution recovery of potash salts lying 5,000 ft. below the surface. Drilling is under way, but a tight security net has concealed any other indication of progress.

Standard's method—long used by PPG's Chemical Division (formerly Columbia-Southern) in solution mining of common salt—is getting this test because of the difficulty encountered by other companies in efforts to mine potash by conventional methods in Saskatchewan's 340-mile potash belt. Continental Potash Corp. (site No. 6) has been stopped at least temporarily by pressurized water at 1,700 ft. Sims Oil Co. is studying the underground water situation in its carnalite deposit near Wilkie (site No. 7). Potash Co. of America (site No. 8) was in production for some months before water penetrated its shaft last December; resumption date is still indefinite. International Minerals & Chemical (site No. 9) got its shaft down past the worst of the water by using a cast-iron lining, has returned to normal shafting methods but still has a long way to go. Various other companies—Canadian, U.S., and European—are sitting tight and waiting to see which, if any, of the pioneering companies finds a way to beat the water.

In Lea County of southeast New Mexico (site No. 10), Farm Chemical Resources Development Corp. is still studying the process it developed for its holdings there.

Meanwhile, present producing firms (sites 11, 12, 13, 14) have started to benefit from last month's approximately 7% price increase (*CW Market Newsletter*, June 10). First-half deliveries, however, dipped 6.7%, to about 1.25 million tons.

national roundup

Rounding out the week's domestic news.

Companies

Aerojet-General Corp. (Azusa, Calif.) has purchased a 45% interest in Global Marine Exploration Co. (Los Angeles), in which Union Oil Co. of California also owns 45%. Global, which did deep-sea drilling for National Science Foundation's Mohole project, will help Aerojet study the possibility of launching extra-large space vehicles from the ocean and explore submarine mineral deposits for possible commercial recovery.

Canada Duphar Pharmaceuticals Ltd. (London, Ont.) has been established as a joint venture of Philips-Duphar, a producer of basic chemicals and pharmaceuticals in the Netherlands, and John Labatt Ltd., a London, Ont., brewery. The new company, in turn, has bought out Charles R. Will & Co., manufacturer of medicinals and pharmaceuticals in London. Labatt has been researching fermentation products closely allied with the pharmaceuticals field.

Reynolds Metals Co., (Richmond, Va.) plans to acquire Tilo Roofing Co. (Stratford, Conn.) have been approved by Reynolds stockholders. Tilo manufactures, sells and installs asphalt and asbestos-cement siding and asphalt roofing materials. Reynolds' stockholders also authorized 5 million additional shares of common stock (new total: 25 million).

Dorr-Oliver Inc. (Stamford, Conn.) has acquired Titlestad Corp. (New York), which will operate as a division of the parent company. Titlestad designs sulfuric acid plants; Dorr-Oliver (*see p. 48*) supplies equipment for sulfuric-consuming phosphoric acid and phosphate fertilizer projects.

Expansion

PVC Film: Reynolds Metals (Richmond, Va.) is expanding its Grottoes, Va., plastics plant, boosting capacity for oriented polyvinyl chloride film to 9,000 lbs./year. Completion is due by year's end. The material is used to wrap fruits and vegetables and as a multipack wrapper for cans, canisters and cartons.

Veterinary Drug: Merck & Co. (Rahway, N.J.) plans a 40% expansion of its Elkton, Va., plant, which produces Amprol, a poultry-feed additive to prevent coccidiosis, a disease of major significance in the poult-

try industry. The \$2-million project is due for completion next February.

Polyethylene Coating: Champion Paper & Fiber Co. (Hamilton, O.) is preparing to add facilities for polyethylene extrusion coating of paper products at its Waynesville, N.C., plant. The 35,000-sq.ft. addition is due for completion early next year. Product will be used for packaging various dairy products.

Alkylated Amines, Catalysts: Universal Oil Products (Des Plaines, Ill.) has appropriated an additional \$1.9 million for expansion of its various plants. The major part will be used to enlarge its Shreveport, La., facilities for producing oil refining catalysts and alkylated amines for use in manufacturing UOP's antioxidants and antiozonants. UOP budgeted \$6.5 million for similar projects earlier (*CW, July 11, p. 24*).

foreign roundup

Rounding out the week's international news.

Nitrogen/U.K. Fisons Ltd. is expanding its nitrogen factory in Flixborough, Lincolnshire, to more than double its present capacity of 14,600 tons/year. Extenions include an ammonia plant, gas reform plant, compressor building housing six units, and a new water cooling tower. Completion target: early '62.

Polybutadiene Rubber/Brazil: The Lummus Co. (New York) and Firestone Tire & Rubber Co. (Akron, O.) have been awarded a joint contract to build a 28,000-tons/year polybutadiene rubber plant near Recife. The project is sponsored by a Brazilian government agency created to promote industrial development in the northeast part of the country.

Pharmaceuticals/Australia: Merck Sharpe & Dohme International, division of Merck & Co. (Rahway, N.J.), plans to build a \$1 million pharmaceuticals plant at the site of its chemical plant in South Granville, a suburb of Sydney.

Fertilizer/U.A.R.: Capacity of the Egyptian Chemical Industries Co. (KIMA) fertilizer plant at Aswan has been expanded from 1,200 to 1,600 tons of ammonium calcium nitrate per day. Other KIMA chemical projects authorized by the U.A.R.'s Five-Year Industrialization plan: a \$10-million, 22-tons/year heavy water plant, whose contract is expected to be signed soon with a West German firm; a \$20-million aluminum project at Aswan to be built by an as-yet unnamed international company.



Management Fill-In: P&G's Byrd reports at pollution-control meeting to Ewell (left) and Krausser.

Making Prevention Pay Dividends

This week, the three-man pollution-control team at Procter & Gamble Co.'s technical center in Cincinnati's Ivorydale section is deep in a new project: early planning of control measures for a soon-to-be-built detergent plant at Augusta, Ga.

At a recent meeting (*photo, above*) on the status of the company's pollution-control programs, J. Floyd Byrd, who supervises the group, detailed the course of action to James Ewell, vice-president of manufacturing and employee relations.

The team's planning and the meeting with Ewell (held semiannually) are part of P&G's continued effort to anticipate pollution problems. By anticipating, thus preventing, difficulties, the company has built a good record of coping with the complex and often touchy subject of pollution control. And this record has been won at a cost that compares favorably with pollution-control outlays of other large companies.

Record Speaks: In all, 32 P&G and

subsidiary plants in the U.S. have spent \$26.5 million since '45 on air and water pollution-control measures. Until '56, \$14.85 million was divided almost equally between initial equipment cost and the operating cost of installed equipment. But in the last five years, of \$11.65 million spent, only \$2.9 million went into new equipment; operating costs were \$8.75 million.

While these are sizable sums, they're not high for a company the size of P&G (\$1.4 billion sales in '60; 26th highest in the U.S.), considering that most of its plants are in urban areas where air-pollution laws and odor-control measurement must be extensive.

Part of the Design: "It is our business as engineering specialists to achieve the desired results at lowest expense. And we can minimize cost by considering pollution control as an integral part of the design of new plant facilities," says Byrd.

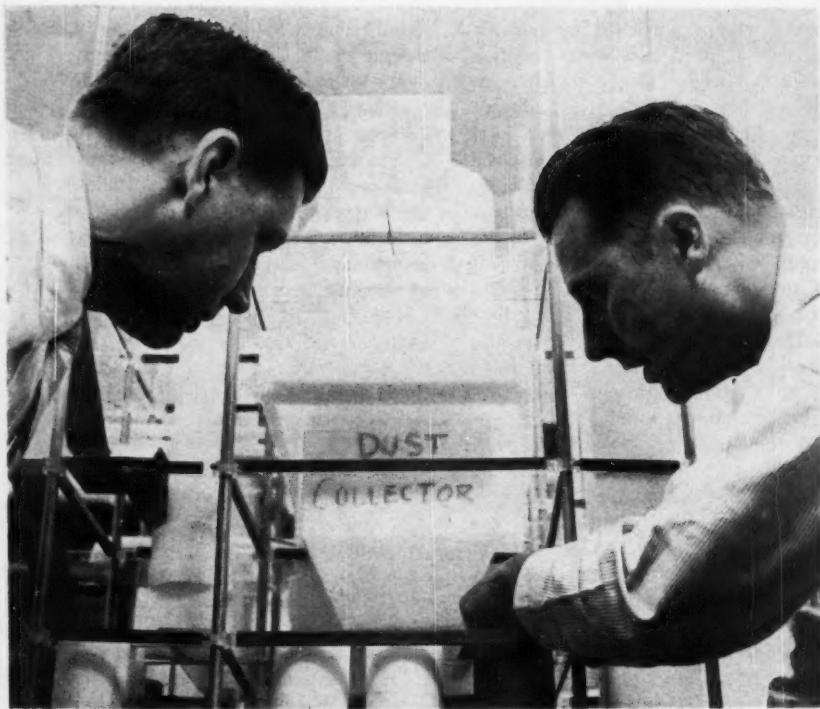
But Byrd's statement is deceptively

simple. For instance, in planning the new Augusta plant, the site evaluation included an estimate of cost of waste disposal. Process design figures into the ultimate determination of this cost. Byrd's group, as a segment of the engineering division, headed by J. W. Krausser, is brought in at the beginning of design work so that a site selection check-list can be made for the engineering group.

Joe Walter, one of Byrd's assistants, worked on the Augusta check-list, got the project engineering group to report on the existing municipal waste-disposal system.

At a site where there is no municipal system, the engineering group investigates the characteristics of local streams. Similar information is sought on air pollution.

Two major factors in selecting a site for a pulp mill (P&G has two subsidiaries in the pulp field), are waste disposal and odor control. In most of P&G's other process operations, however, the pollution-control group's site



Model Study: Dust collector is part of first model of new plant.

in Pollution Control

recommendations do not weigh as heavily.

From the check-list information, several control systems (and their costs) were worked out for the Augusta plant. A check of process history readily eliminated the need for a test program.

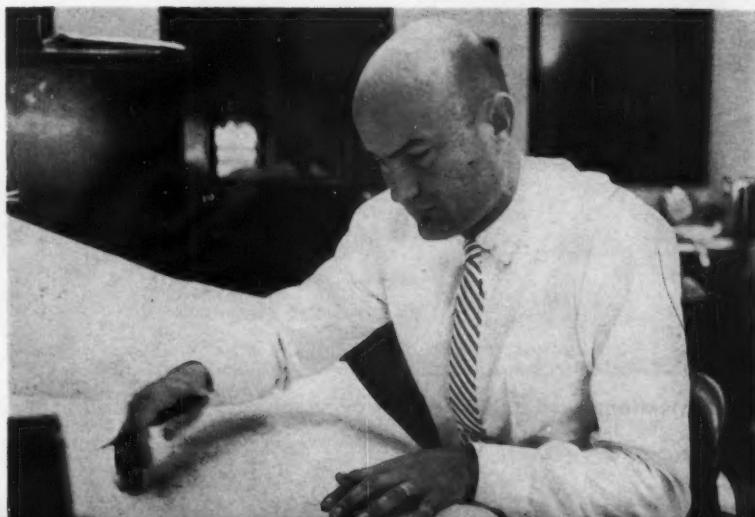
But at times considerable test work is needed. For example, P&G was the first to use a Gibbs aeration-flotation unit for greasy water. It has done pioneer work with dewatering waste pulp fibers from a Sveen-Pedersen flotation unit to permit disposal of fibers to a landfill. And it has developed advanced techniques in measuring odor quantitatively.

Tab for Tests: In all, about \$500,000 has been spent since '45 on experimental work. Much of this has been done by P&G itself, but Byrd is a firm believer in getting outside help. "We often go outside," he says, "when we are working with something new or need special test facilities. And it can be quite important to do so

when we want 'objective' backing on a project — local authorities are always anxious to know your data is corroborated by someone else."

Once alternate control systems have been devised, they are presented—with the group's recommendations—to the engineering team and management.

Design: Byrd checks new plant layout for waste control measures.



management. When management's decision has been made, Byrd's group is responsible for control equipment design and startup at the plant.

Because about half of the team's time is spent on engineering design, all members have wide engineering backgrounds. Walter, in the group for only about a year, agrees with Byrd that at least five to six years in various phases of engineering with the company are desirable.

"You have to know the company's processes and plants. And, although it is not necessary to have worked in a particular plant, you have to be able to see that plant's viewpoint," declares Walter.

Official Viewpoint: Another important viewpoint is that of the state and local authorities. A member of Byrd's group talks with these officials as soon as it has rough data on a project. Byrd points out that anticipating problems and letting everyone know about them can be just as important at this stage as in engineering.

"If you try to put something over on the local officials they'll detect it — and, if you don't, they'll appreciate it," he advises.

Byrd keeps local authorities up to date on new plants—keeps himself up-to-date by frequent visits to plants (about twice a month) for startups, consulting jobs and problem solving. But outside of the early visits to local authorities, Byrd leaves to the plant manager the job of continuing direct contact with local authorities.

The group is called into a local

situation only at a plant manager's request. On the other hand, Byrd encourages calls upon his team. "For example, if a plant is concerned about a local waste-disposal ordinance, we may be able to help because we have seen ordinances from dozens of communities, whereas the plant manager may have seen only a few," he says.

Byrd's group gets help at each plant. At the large (more than 2,000 employees) Ivorydale plant two men spend full time on waste-disposal and air-pollution problems. But at smaller plants, one man may spend as much as one-third of his time on pollution control — and these plants lean heavily on Byrd's group.

Worth the Effort: "A company that operates one small plant certainly wouldn't need a full-time pollution group. But for two or more plants, group effort becomes worthwhile," Byrd says.

P&G's pollution-control function was originally split between two groups. In '46 a two-man group began working on odor-control problems, later broadened its function to include all air-pollution problems. Within a short time another group (which included Byrd) was organized to handle engineering work in basic raw materials and special problems; it quickly found itself concentrating on waste disposal.

"We would have started sooner if World War II had not intervened and siphoned off manpower. It was

just before the war that processes began increasing in complexity and causing major pollution problems," says Ewell, who was the first to use the services of Byrd in a water-pollution problem, while plant manager at Quincy, Mass.

By '51 P&G had seven men in a group looking after waste disposal and air pollution. But once the basic work with existing plant facilities was brought under control, the size of the group was reduced. Today, Byrd and Walter handle water- and air-pollution problems.

The third member of the group, Austin Phelps, works on in-plant problems — mainly dust control; but because of industry's increasing awareness of noise problems (*CW*, Sept. 28, '57, p. 96) up to 20% of his time is spent on noise control.

Combined Treatment: Byrd explains that cost of P&G's pollution control has been kept low because most of the company's plant wastes are easily treated in normal municipal sewage-treatment plants. "Since most of our plants are situated in or near urban areas, we can avoid the high first costs and operating costs for small treatment plants of our own — although we willingly pay our fair share to treatment costs," he says.

But this straightforward statement itself is a tacit tribute to the effectiveness of the pollution-control group in anticipating—and dealing with—problems. For, at the time the group was

formed, 75% of the cities in which P&G had plants did not have waste-treatment facilities. And convincing municipalities of the advantages of sharing facilities was not always easy —nor was it easy to get equitable cost-sharing agreements.

However, P&G got a good start in Cincinnati. Before municipal treatment facilities were installed there, the company surveyed its wastes for total flow, B.O.D. (biochemical oxygen demand), suspended solids and pH of streams. Because it knew the city would have trouble, processes were analyzed and changes made. Wastes were segregated, pretreated and concentrated (a dilute waste discharged to a sewer has only to be reconcentrated later).

Byrd and his predecessor, Virgil Gex, have served on many committees, and various members of P&G's pollution-control group have presented papers at technical meetings. Today Byrd estimates that 10-15% of his time is spent working on various industry and technical committees.

"It is our policy to accept as many speaking engagements and as much committee work as we can. One of the most important aspects of the job is to build up our contacts with industry and the community, because we must sell our ideas and exchange approaches," says Byrd.

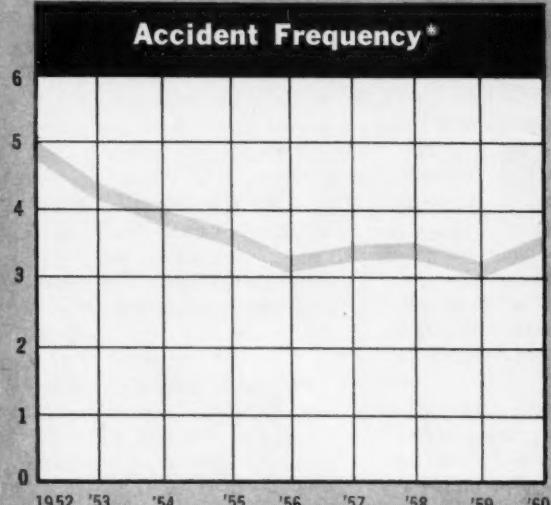
Judging from P&G's success in pollution control, "selling" ideas isn't a very difficult problem.



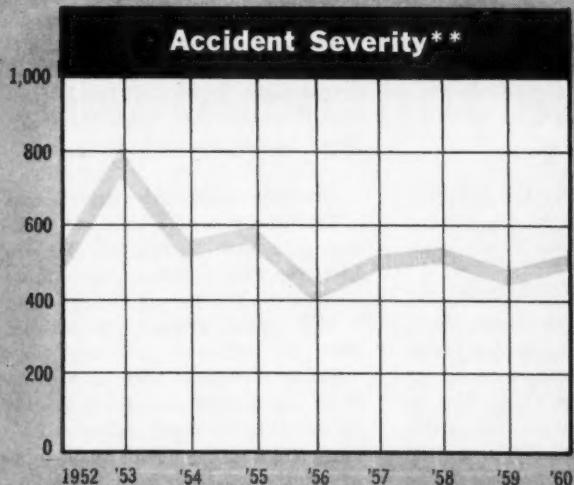
Odor Detection: Byrd sniffs process odor sample, rates it with group members Phelps (left), Walter.

For Plant Safety — a Setback in '60

National Safety Council data for '60 reveal a slight increase in accident frequency and severity at chemical plants.



*Frequency rate is number of disabling injuries per 1 million man-hours of exposure.



**Severity rate is number of days lost per 1 million man-hours of exposure, including charges for permanent disabilities and deaths.

The chemical industry's safety performance slipped last year, according to new data (see table) from the National Safety Council (Chicago).

The industry's accident frequency rate of 3.71 (the number of disabling injuries per million man-hours worked) was the highest since '55 and up 12% over '59. This NSC figure is an average of 18 chemical industry segments.

The accident severity rate (the number of days lost per million man-hours worked) jumped to 538, 9% higher than in '59. This is still lower, however, than in '58, when accident severity reached 552.

Despite these slight setbacks the industry's safety record remains one of general improvement since NSC began

Chemical Process Industries	Accident Frequency* 1959	Accident Frequency* 1960	Accident Severity** 1959	Accident Severity** 1960
Acids	4.85	4.24	1,798	245
Alcohol and wood distillates	9.00	10.16	7,854	2,706
Chlorine and alkali	3.74	4.01	205	1,152
Coal-tar products	5.56	7.86	1,032	846
Fats and oils	10.33	10.06	1,571	1,018
Fertilizers	10.60	10.87	1,693	2,185
Fuses and powder	2.23	3.30	124	1,281
High explosives	2.10	1.58	1,784	82
Industrial gases	6.98	8.76	1,242	1,183
Laboratories	1.41	1.72	95	564
Paint and varnish	4.09	4.22	163	509
Pharmaceuticals, fine chemicals, cosmetics	3.22	3.45	498	149
Photographic film	1.74	4.21	283	290
Plastic materials	1.99	2.10	93	350
Salt	13.48	12.15	1,471	1,591
Soap and glycerin	3.65	2.61	183	805
Synthetic fibers	2.35	1.46	315	234
Synthetic rubber	1.85	1.94	1,505	45
All chemical process industries	3.32	3.71	495	538

tabulating data in '23. For example, that year the frequency and severity figures were 24.55 and 4,780, respectively.

Compared with 41 other industries, the chemical industry in '60 scored ninth in frequency and 17th in severity. The rubber industry, once again bettering the chemical industry's record, had a frequency rate of 2.68 and a severity record of 402. The petroleum industry's accident frequency and severity rates were not as good (6.89 and 617), and the glass industry had a higher frequency rate (7.12).

Motor Hazard Hassle

The agenda for the upcoming American Petroleum Institute meeting (Nov. 13, Chicago) doesn't include the subject of reclassification of hazardous areas for electric motors. But informally this topic is likely to cause lively discussion. And the chemical industry will be listening with great interest because a change in classification could mean potential savings of 50% or more in electric motor costs.

Ever since API published recommendations for the reclassification of hazardous motor areas four years ago, there has been a growing trend toward the use of less costly open-type motors in place of explosionproof motors in these areas.

The National Electrical Code classifies a hazardous area Division 1 or 2, depending on the duration of the hazard. If potentially explosive conditions continually exist around the motor it is classed Division 1; if explosive conditions would be unusual (e.g., a process leak), NEC calls this Division 2.

Motor makers point out that improvements in recent years, such as better insulation, have made open motors more attractive for use in the areas of temporary hazard (Division 2). Use of silicon rubber insulation instead of the old standby, varnish, gives the motor better resistance to weathering, makes it less likely to arc dangerously. Furthermore, plant men point out that more widespread use of continuous processes means less motor starting and stopping, less arcing.

Open-type motors cost less because of their construction. As the name implies, this type allows the surrounding

air (and possible explosive gas mixtures) to blow over and cool the windings. The danger here: if the motor arcs while the gas blows over it, an explosion is possible. In contrast, a metal shell seals the surrounding atmosphere out of an explosionproof motor.

However, plant men point out one big problem: getting insurance companies to approve the open motor installation. Unless fire insurance underwriters sanction the installations, insurance will be more expensive (if available at all) — thus canceling the effect of lower equipment costs.

Despite this the chemical industry is substituting modified open motors for explosionproof equipment wherever it can. Allis-Chalmers Mfg. Co.'s D. N. High and D. K. Russell indicate how this can be done without materially increasing the hazards.

One way is "partial" explosion-proofing — making only the conduit box and other electrical devices explosionproof. In this way, for example, a chemical company substituted an open-type 5,500-hp. motor on a hydrocarbon compressor where an explosionproof motor was formerly indicated.

Also gaining favor among plant engineers are two other methods: inert gas pressurizing and forced ventilation. The first method employs a higher-than-atmospheric nitrogen pressure to keep explosive vapors out of the open-type windings. In the forced ventilation technique, a steady draft of uncontaminated air is blown over the motor. Plant men say that the high maintenance costs of fans, ducts and pressure-controlling devices are major drawbacks to these methods.

EQUIPMENT

Portable Testers: Portable test units, one a pressure gauge, the other a potentiometer, are two newly available products.

The pressure gauge, offered by Manning, Maxwell & Moore, Inc.'s Gauge & Instrument Division (Stratford, Conn.), is an expansion of the Ashcroft Pocket Test Gauge line to include compound ranges. The ranges are from 30 psi. and 30 in. to 300 psi. and 30 in. Pressure ranges of the gauge line are from 0-30 psi. to 0-1,000 psi.

A protective cover makes the gauge

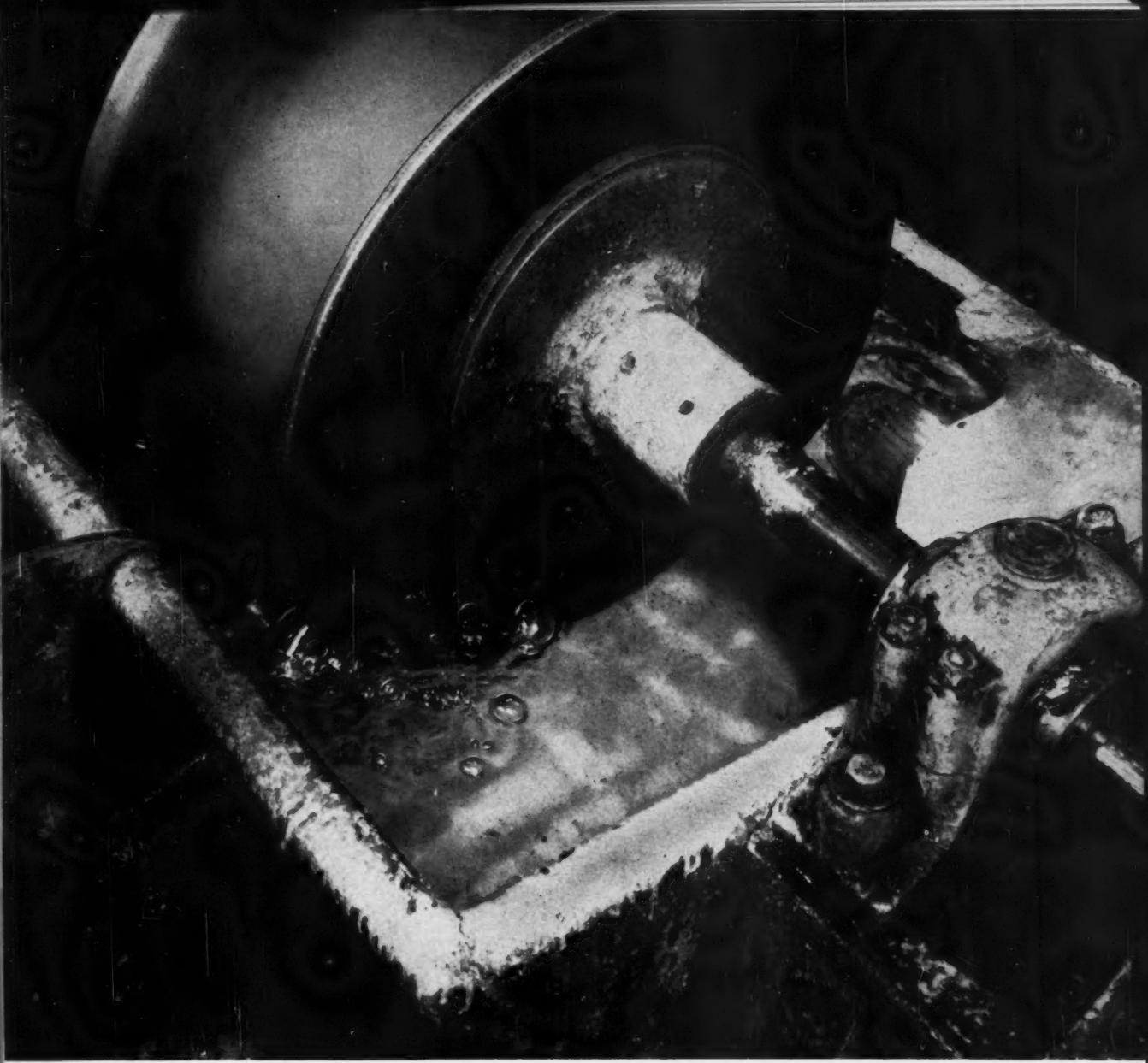
suitable for carrying in a pocket.

The potentiometer, offered by Leeds & Northrup Co. (4934 Stenton Ave., Philadelphia 44), is a portable unit for on-the-spot measurements of temperature. It is available in three models—8694 Single-Range and 8695 Double-Range for direct temperature reading in 15 ranges, 8696 Double-Range Millivolt for 0-22 and 20-64 emf. measurements—each with a $\pm 0.3\%$ accuracy. Each unit weighs 4½ lbs.

Leaf Filter Cleaner: The Duriron Co., Inc. (P. O. Box 1019, Dayton 1, O.) is offering a new pressure leaf filter with an oscillating sluice that is said to completely clean all types of filter cake from leaves up to 60 in. high. The filter has tubular sluice jets on each side of the leaves. The jets, mounted on a header pipe, emit high-pressure liquid streams that blast the cake away from the leaves. The header is rotated mechanically or manually to assure jet coverage of the entire leaf surface. Total cleaning time can be reduced from 20-30 minutes to as low as 15-30 seconds.

Flowmeter Calibrator: North American Aviation's Rocketdyne Division has developed a new, highly accurate device for calibrating flowmeter systems, which it has licensed to Norlac Engineering and Manufacturing Co. (Culver City, Calif.) for sale. The calibrator is a combination pressurized supply tank, test and flow-control station, volumetric standpipe and return unit with control and recording devices. It can be used over wide ranges of pressures and flow rates for liquids, is currently being used at Rocketdyne's Neosho, Mo., plant for high-thrust liquid-propellant testing.

Urethane Seals: A complete line of urethane hydraulic seals and packings is a new offering of Disogrin Industries (510 S. Fulton Ave., Mount Vernon, N. Y.). The components have a high tensile strength that enables them to withstand pressures from 3,000 to 10,000 psi. with no back-up rings. A special chamfered sealing lip results in leakproof sealing at very low pressures. Compatible with most hydraulic fluids, the seals and packings offer high resistance to abrasion and wear, will withstand operating temperatures from -40 to 225 F.



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Only air bubbles . . . but they indicate a tiny leak in a drum being tested at Southern States Containers. Every drum that leaves our plant has been air tested for leaks . . . and when tell-tale bubbles appear, the drum is scrapped.

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Top Brass Polisher

Dad never kept his brass so shiny, but, of course, his metal polish didn't contain Jefferson polyethylene glycol to help improve the tarnish removing, rinsing, and grease dispersing actions.

This is just one of the many versatile uses for polyethylene glycols, which fall into two categories: uses as a chemical reaction intermediate and as an unreacted polyethylene glycol. The reactive hydroxyl groups allow conversion of polyethylene glycols to mono- and diesters, ethers, and other compounds having use as specialty items or further reaction intermediates. Mono- or diesters of fatty acids are nonionic surface-active agents valuable as detergents; water-soluble textile, leather and metal lubricants; emulsifying agents in cosmetic, petroleum, leather and agri-

cultural formulations; and vehicles for certain therapeutic agents. As a result, they are capable of being used in hard water or acid solutions where normal anionic products break down. Unreacted polyethylene glycols make effective plasticizers for a variety of compounds and are useful as lubricants in the textile, rubber, cellulose, and cork processing industries.

Jefferson offers polyethylene glycols having molecular weights of 300 to 4000. Weights from 300 to 600 are viscous, water-white, hygroscopic, completely water-soluble liquids, while 4000 is a hard waxy solid supplied as flakes. Jefferson's technical service people can assist in determining the right polyethylene glycols for your applications.

POLYETHYLENE GLYCOLS

POLYETHYLENE GLYCOLS

SPECIFICATIONS

	<u>300</u>	<u>400*</u>	<u>600</u>	<u>4000**</u>
Average molecular weight.....min.	285	380	570	—
	max.	315	420	630
Specific gravity, 20/20°C.....min.	1.125	1.125	1.120 ⁽¹⁾	—
	max.	1.130	1.130	1.125 ⁽¹⁾
Color, Pt-Co scale.....max.	25	25	25	50 ⁽²⁾
Ash, wt. %.....max.	0.10	0.10	0.10	0.25 ⁽³⁾
pH, 5% aqueous solution, 25°C.....min.	4	4	4	4.5
	max.	7	7	7.5
Viscosity, 210°F. centistokes.....min.	—	—	—	75
	max.	—	—	85
Freezing point, °C.....min.	—	—	—	53
	max.	—	—	56
Acidity as acetic acid, wt. %.....max.	—	—	—	0.02
Water solubility.....	Com- plete	Com- plete	Com- plete	Com- plete ⁽⁴⁾

Note: Polyethylene glycols of all molecular weights are clear and substantially free of foreign matter.

* U.S.P. Grade of Polyethylene Glycol 400 also available.

** Meets U.S.P. specifications.

(1) At 25/4°C.

(2) In 25% water solution.

(3) Sulfated.

(4) Light transmittance of a 25% solution before filtration shall be not less than 95% of the value obtained after filtration.

SELECT PROPERTIES

	<u>300</u>	<u>400</u>	<u>600</u>
Flash point, (open cup), °F.....	>375	>425	>450
Viscosity, SUS, 210°F.....	45.4	52.7	61.7
Weight, 20°C., lbs./gal.....	9.39	9.40	9.37

SHIPPING AND HANDLING

Jefferson polyethylene glycols are available in coiled tank cars, mixed-shipment compartmented cars, coiled tank wagons in certain areas, resin-lined, non-returnable steel drums, and fiber bags (depending on the molecular weight).

The handling and storage of the liquid polyethylene glycols is a straightforward operation. However, due to their relatively low freezing point, hygroscopicity, and color instability at elevated temperatures, storage conditions should be controlled. These products should be maintained 10-15°F. above their freezing point. Temperatures above 120°F. should be avoided. Complete handling and storage recommendations are contained in the literature at right.

TECHNICAL INFORMATION

For more detailed chemical and physical data on polyethylene glycols, ask the Jefferson technical service people or write for this Technical Brochure . . .

Jefferson Chemical
Company, Inc. 1121
Walker Avenue,
P. O. Box 303,
Houston 1, Texas.



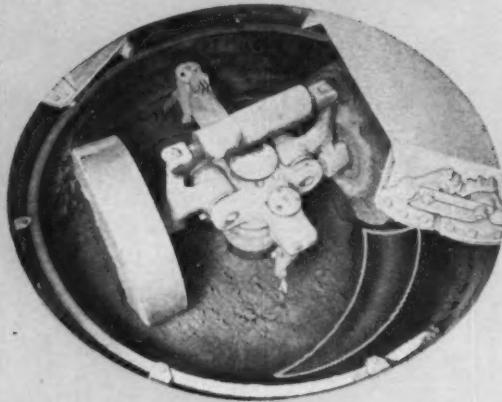
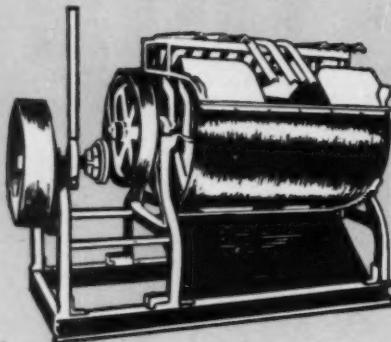
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The muller is a very specialized piece of mixing equipment. It is specifically designed for use where an intensive, intimate blend of dry/solid, solid/solid, or wetted/solid materials is needed.

Trying to mull, or achieve controlled dispersion, in a machine not equipped with MULLER WHEELS is like flying a tailless kite on a windy day . . . you may get it off the ground, but you have no control.

The fact that you can control dispersion through the use of muller wheels is the reason why at least three manufacturers have specialized in this art for about half a century. Today, the need for controlled dispersion has become increasingly evident to processors as well as to mixer manufacturers . . . everybody's got a muller. So, if you need controlled

dispersion, it will pay you to remember that *mulling* is more than a matter of semantics. What was a *mixer* last year . . . is not necessarily a *muller* this year.

Simpson Mix-Muller Division has devoted a 12-page bulletin to the subject. It's called the HANDBOOK ON MULLING. Why not write for a copy? Or, see it in the current *Chemical Engineering Catalog*.



Presented in the interests of maintaining truthful presentation of—and purposeful application for, the mulling principle of mixing by:
SIMPSON MIX-MULLER DIVISION
NATIONAL ENGINEERING COMPANY
642 Machinery Hall Bldg. • Chicago, Illinois

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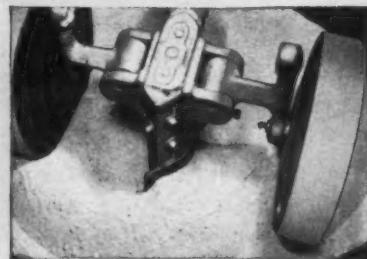
NOTHING MULLS LIKE A MULLER



GOING: Mix is wetted, dispersion of coating media begins as lumps begin to form.



GOING: Smearing, spatulate action breaks up lumps as mulling action disperses moisture.



GONE: Agglomerates almost gone as blending nears completion. Mix is homogeneous, thorough.

Washington Newsletter

CHEMICAL WEEK
August 5, 1961

The business impact of President Kennedy's defense program

should be fairly widespread and prolonged. Pouring an extra \$3.5 billion into a rising economy can't help but boost it. However, inflation could become a serious threat. This is why Kennedy warns of the possibility of a tax rise next year. For political reasons, he will seek the extra revenue to balance the budget. For economic reasons, he will try to draw excess funds out of the spending stream.

Of more immediate concern to the chemical process industries, the defense buildup will mean a massive spurt in procurement of conventional, nonnuclear explosives. The plan is designed to bolster the nation's capacity to fight limited wars; no funds are allotted for a further expansion of bomber, missile and other strategic forces.

Of \$1.8 billion tacked onto the Pentagon's budget for procurement, more than \$214 million is earmarked for additional production of conventional explosives. The Army plans to buy more armor-piercing antitank rounds and artillery and small arms ammunition; the Navy, torpedoes and other naval ammunition; the Marine Corps, 106-mm. recoilless rifle rounds and assorted types of ammunition; the Air Force, 20-mm. ammunition, land mines, fragmentation bombs and other TNT explosives.

Final procurement plans have yet to be set. But the aim is to place orders with explosives suppliers who can deliver within the next 10-12 months rather than with producers who would have to bring in new capacity, thus lengthen delivery lead-times.

The \$207.6 million Kennedy seeks for civil defense includes \$58.8 million for the stockpiling of such items as first-aid kits, sanitary supplies, water supplies, radiation meter kits and tools to remove debris. More money for medical supplies will be forthcoming next year after the survey of shelter potential is completed.

The Justice Dept. is the key to Du Pont divestiture. It has not changed—and it is not expected to change—its position against bills that would ease the tax burden on stockholders through court-ordered divestiture of 63 million shares of General Motors stock (*CW Washington Newsletter, July 29*).

Reports last week that the Administration is supporting a tax-easing bill submitted by Sen. John J. Williams (R., Del.) and Rep. Noah Mason (R., Ill.) are misleading. What Treasury Secretary Douglas Dillon told Williams is that he would not object to his bill. This is pretty much the same thing that he has said previously about other bills. But Dillon added that the Treasury Dept. "takes no position with respect to the need or desirability of tax relief in antitrust divestiture cases. . . ."

This is the rub. The Justice Dept. does take a stand in opposi-

Washington Newsletter

(Continued)

tion to such tax relief. There are no indications it will alter this position. In addition, the House Ways & Means Committee—which originates all tax legislation—is bogged down in extensive tax law revisions. The committee's schedule probably will not even permit hearings on the Williams-Mason bill this year.

The tax credit plan for spending on machinery and equipment

is not necessarily dead, but its chances have diminished considerably because of the defense buildup. Approval by the House Ways & Means Committee was tentative, with another look at the situation scheduled for mid-August. Since there is strong business support for the proposal, the committee will be inclined to keep it in the bill—if the anticipated \$1.1 billion loss to the Treasury does not throw the fiscal '62 budget too far out of kilter.

The committee turned the Administration down, however, on its request to eliminate foreign "tax havens" (*CW Washington Newsletter, July 15*). And committee members are considerably upset over what they feel is an arbitrary decision in this matter by the Administration. A. O. Smith Corp. (Milwaukee) protested that the Export-Import Bank turned down its request for a guarantee on a \$60,000 sale of gasoline pumps on the grounds that its wholly owned Venezuelan subsidiary, which made the sale, was "established primarily for tax reasons."

The issue of eliminating tax deferral on income earned by tax haven corporations was postponed until next year by the House Ways & Means Committee. The committee requested the Treasury to sharpen up its ideas by publishing specific language it would like put into law.

This language has now been released and will be studied by Ways & Means members and industry officials to see (a) whether any such change in tax treatment overseas profits is desirable and (b) what changes would be desirable in the Treasury language if tougher taxation of foreign earnings is to be applied.

Among the items in the Treasury's 20-page draft: definition of a foreign manufacturing corporation, which under the Treasury proposals would automatically be free from classification as a tax haven operation.

Imposition of user charges on barge lines will be requested by the Administration next January. This and other changes in transportation law are included in the draft of a proposed Presidential message to Congress. The message was to have gone to Congress immediately but at the last minute the White House decided that the House and Senate had enough to do this year.

In addition to user charges on inland waterways, the message asks Congress to forbid "destructive rate-cuttings" between competing modes of transportation, crack down on "gray area" trucking, and keep private truckers out of the for-hire domain of common carriers. Many of the proposals would have a direct bearing on freight rates.

SPECIAL REPORT



WIDE WORLD PHOTOS

In Caracas, Venezuela, crowd of student-led demonstrators swirls around flag-waving girl. Civil disturbances underscore the growing . . .

CRISIS IN LATIN AMERICA

*Riots—raw sign of the crisis threatening to envelop the whole of Latin America.
For the U.S. chemical industry, a major market is at stake.*

Something big and hopeful and dangerous is happening in Latin America. It exploded into revolution in Cuba, sent shock waves across the Caribbean to stir the stagnant Central American states, and lit fires across the huge continent below.

Violence has erupted in the past year in Argentina, Bolivia, El Salvador, Guatemala, Nicaragua, Paraguay and Venezuela. Bolivia last month declared a state of siege, smashing a Cuban-backed plot to overthrow the government. During Adlai Stevenson's tour of South America three countries—Chile, Uruguay and Bolivia—had to quell disorders.

Other new things are happening. The Russians and

Chinese are pouring more propaganda into the area, and more Latin Americans seem to be listening to them. Neutralism is gaining favor with citizens and with governments. Brazil embarks on an "independent" foreign policy, recognizes Russia. Communist trade and cultural missions tour Latin America, and their visits are returned. New trade pacts are signed. Mexican officials publicly condemn the U.S. stand against Cuba. We fail to muster support for our Cuban policy in most other Latin-American countries.

Peter Grace, whose W. R. Grace & Co. has been in Latin America for more than a century, warns, "There is no longer any doubt that the present situation in Latin America constitutes a danger to the security of the U.S.

LATIN AMERICA

SPECIAL REPORT

Soon, perhaps during '61, it will be decided whether this great and growing area of the world will go forward with us in progress and traditional friendship or whether it will turn to the Iron Curtain as Cuba has already done."

A strong clue to which way Latin America actually does go may well emerge from a meeting getting under way in Uruguay this week.

At the seaside resort of Punta del Este, ministers of 19 American countries will gather Aug. 5 to discuss how their countries will breathe life into the Act of Bogota. This is the proposal for a hemisphere-wide program of social and economic progress that was backed up in March by President Kennedy's call for an "Alliance for Progress," and by a Congressional appropriation of \$500 million in May.

For the U.S. chemical industry, this is a deadly serious matter. U.S. chemical exports to Latin America totaled almost \$400 million last year. And in the last three years U.S. chemical companies invested some \$178 million there. During '55 the area consumed an estimated \$2.3 billion worth of chemicals, of which 25% was imported. United Nations forecasts peg '75 chemical consumption at about

\$8.2 billion. Conceivably, domestic production could supply about 11% of this demand. It would mean a big market for exports, and expanding investment prospects.

Pulling in Horns? Are U.S. investors losing interest in Latin America? Are they being "scared off"?

It is true that foreign investments in Latin America have been declining in recent years. But this trend doesn't demonstrate a lack of confidence. In fact, manufacturing investment has continued to rise. The value of U.S. direct manufacturing investments in Latin America climbed from \$780 million in '50 to \$1.4 billion in '59. In each of the three years, '57-'60, U.S. manufacturing investments increased. Chemical industry investments followed this pattern.

The drop in total U.S. Latin-American investments took place in the more traditional sectors—mining, petroleum, utilities. Partly responsible: the weak world price situation in minerals and petroleum. And foreign investors are less than enthusiastic about the electric power outlook since government ownership of utilities has become a pattern.

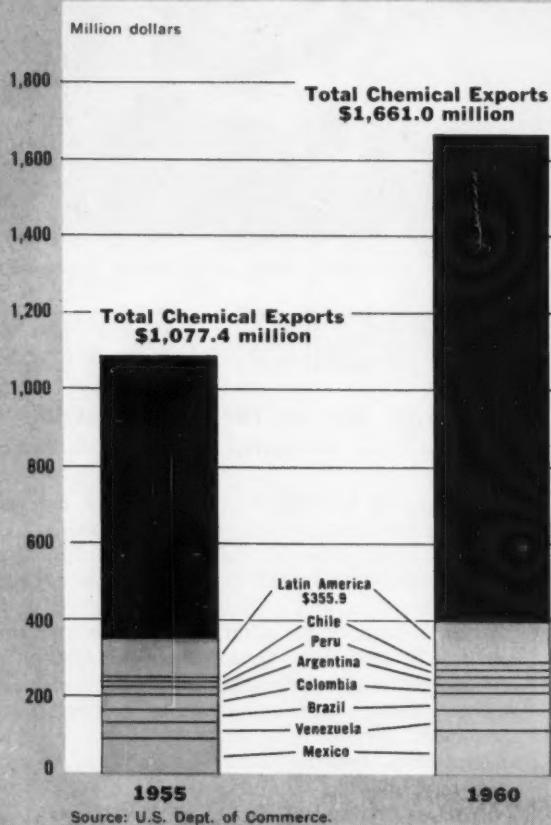
It is true that the rate of increase of U.S. manufacturing (and chemical) investments in Latin America has not kept

Latin America: the Big Picture

	Population ('50) million	Gross Domestic Product ('50) (billion dollars)	Per-Capita? Product ('50)	Chemical Imports ³ ('59) (million dollars)	U.S. Chemical Industry Investment ('57) (million dollars)
Argentina	21.0	11.3	538.7	89	47
Brazil	65.7	18.7	284.1	134	85
Chile	7.6	2.4	312.4	44	n.a.
Colombia	14.1	4.5	314.5	75	24
Mexico	34.6	9.9	287.1	177	96
Peru	10.9	1.4	126.1	44	n.a.
Venezuela	6.7	7.0	1,041	127	28
Latin America	200	63	315	905.2	330

1. Provisional. At '50 prices. 2. At '50 prices. 3. U.N. figures, based on dividing total of '58 and '59 nations' figures by two. Sources: United Nations, U.S. Dept. of Commerce.

Static Market for U.S. Exports



Source: U.S. Dept. of Commerce.

pace with investments in Europe. But businessmen and government observers see this as a siphoning off of funds into booming Europe while investment possibilities there still are open, rather than flight from Latin America.

The prevailing feeling among industry men seems to be that Latin-American problems and the threat of Communism there have been exaggerated by the U.S. press. Some say Latin-American governments have learned that the best way to get money from the U.S. is to wave a red flag. There is also the feeling that if severe problems do exist in such "trouble spots" as Bolivia, they are local problems that won't spread to favored places such as Brazil and Argentina.

Borden Chemical Co.'s Augustine Marusi speaks for the optimists when he says, "We don't feel any anxiety about Latin America." Borden has been putting about 40% of its overseas investment money into Latin America.

Confidence is also expressed by a spokesman for New York's First National City Bank, which keeps close watch on Latin America. "We can't say we are in any way disturbed," he maintains. The bank is following its own advice and expanding "full blast" all over Latin America.

Pressure Kettle: Although many businessmen and government officials are optimistic about Latin America, others—including high U.S. government figures, economists, political observers, and many Latin-American leaders themselves—cite reasons for grave concern.

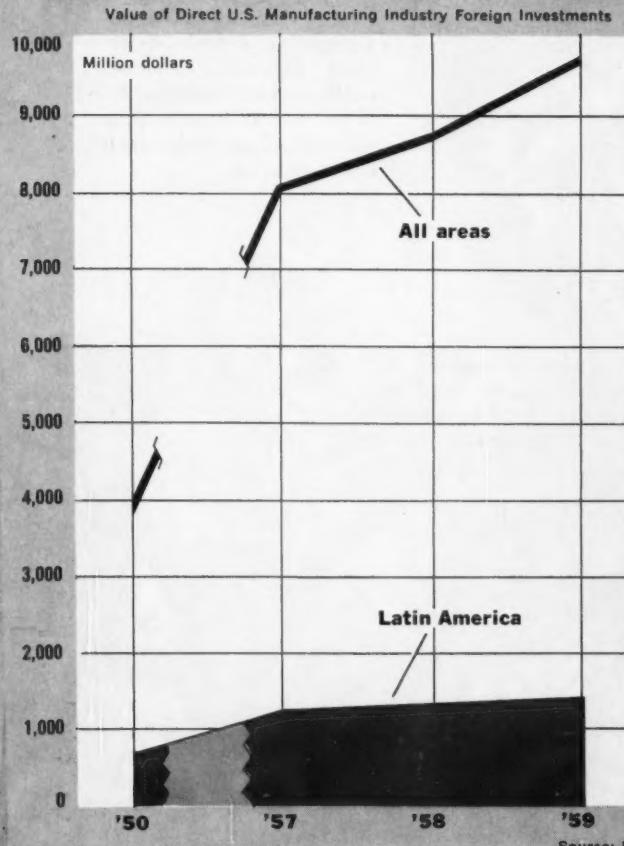
One who views with concern is Raul Prebisch, the Argentine economist who heads the UN's Economic Commission for Latin America. In a recent article about the need for economic and social reform, he says, "It is no longer a question of whether or not such changes will take place, but of who will make them, by what methods and under what political philosophies."

It is dangerous to generalize about the Latin-American republics, which have enormous economic, geographic, political and social variations. But certain crucial problems face almost all of them.

Rapid population growth is one of these. For Latin America as a whole, the population growth rate is the highest in the world—about 2.5%/year. Population is expected to double in 20 years, to triple in 40. This means the economy will have to expand faster than it has just to maintain the present low living standards.

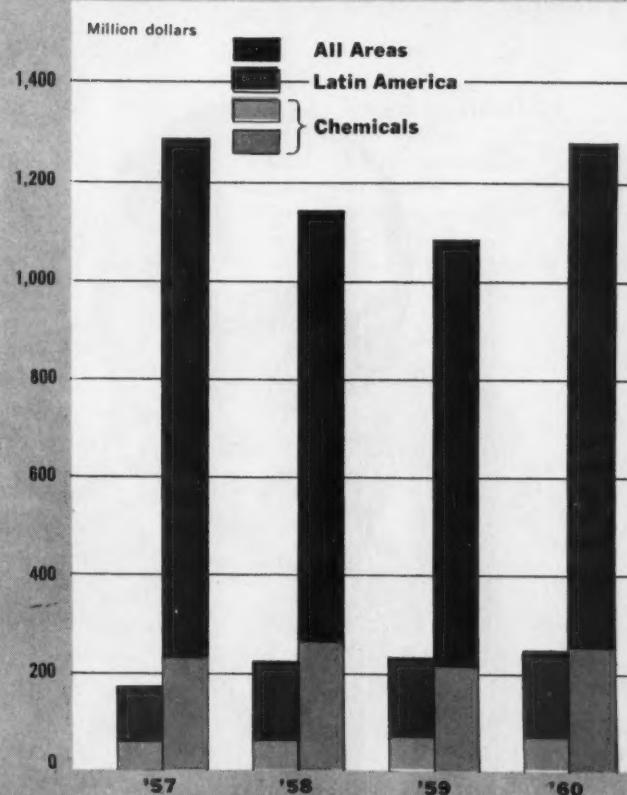
(Text continued on p. 68)

Slipping in Race for U.S. Investment... . . . Although New Outlays Have Held Up



Source: U.S. Dept. of Commerce.

Manufacturing Industry Plant and Equipment Expenditures Abroad



Latin America's Men of Moderation



Janio Quadros, Brazil's new president, is bringing his nation onto the international stage, while girding for a new round of growth at home.



Venezuela's Romulo Betancourt, democratic reformer, walks a shaky tightrope between violent thrusts from the Left and the Right, needs U.S. help to win.



Chile's Jorge Alessandri is trying to salvage an economy shaken by an earthquake, twisted by the vagaries of the metal market, bled by feudal farming.



DRAWINGS BY RICHARD P. KLUGA

LATIN AMERICA

SPECIAL REPORT

Argentina's hard-pressed Arturo Frondizi has pushed through an austerity program, still faces the job of getting his country to grow again.



Mexican President Adolfo Lopez Mateos welcomes U.S. capital to his fast-growing country, but wants it to serve Mexican interests, on Mexican terms.



LATIN AMERICA

SPECIAL REPORT

(Text continued from p. 65)

Over the last 15 years, the record has been fairly encouraging. The 5% average annual growth rate of gross product has been enough to raise real per-capita product by an average of 2.5%/year. But this rate has been slowing. The 3.3%/year average for the '45-'55 period has dropped to less than 0.5% for the '55-'59 period. And these averages hide even grimmer figures. While per-capita product is rising in some countries, it is stagnant in some and falling in others. Last year, for example, it rose 3.6% in Brazil and 3% in Mexico, but inched up only 0.8% in Argentina and 0.7% in Colombia. It declined 1.1% in Chile and 2.1% in Venezuela.

Moreover, per-capita product is not very high to begin with—only about \$300 for all of Latin America. It's higher, of course, in some countries (Venezuela, at \$1,041, is the highest), and appallingly low in others, such as Peru (\$126).

Nor do these figures reveal the full severity of the situation. Even where per-capita income is gaining, as in Mexico, the poor are getting poorer. According to *Economist* of London, only 10% of Mexico's population are substantially better off after 10 years of growth, and 20% are worse off than ever.

Acute inflation over the last 10 years worsened this situation in most countries. It has canceled out much of the gains of economic expansion: Latin Americans today can buy only 98% of the merchandise they purchased in '50. It has widened the gap between the rich and poor, discouraged investment where it is needed most—in industry.

Causes of this situation are manifold and complex. They boil down to three main problems: the land tenure system, the tax structure, and the dependence on exports of a few primary commodities.

For the region as a whole, 1.5% of the land owners own 50% of all arable land. They often farm it inefficiently, leave most of it uncultivated, while hungry peasants scratch the bare mountainsides for food. Most of the tax systems are not progressive, despite the wide disparity in income. And evasion is so rife that probably half the people who should pay taxes don't.

A worsening export situation is a prime reason for the deepening of Latin America's problems. Excluding Venezuela, Latin-American exports have risen an average of less than 0.5%/year since '50. The basic problem is that more than 90% of Latin America's exports are in basic commodities—a narrow range subject to rapid price fluctuations. Moreover, world demand for these commodities is growing more slowly than for industrial products. Result: economic instability, a tightening squeeze on income, and a shortage of foreign exchange needed to buy the industrial equipment that could help diversify exports and cut imports.

Breaking Point: These are the conditions that lead many to conclude that something has to give in Latin America. People who feel optimistic about maintaining stability do so for two reasons: they think the *status quo* can persist, or they believe the necessary changes will be wrought peacefully, or at least without a general conflagration.

There is a lot of history to back up those who believe in the *status quo*. The Latin-American *peones*, after all,

have been starving for centuries, and—except in a few countries, such as Mexico and Cuba—haven't been able to do much about it. There have been many revolutions, but these have mostly been power plays among the ruling classes. Faces have changed, but not the social order. And business, geared to the external export trade, was largely unaffected. Besides, progress is being made, as proved by the shining new buildings in the capital cities and the rising production and income curves.

But there's more to the picture. Historical factors have changed. A young, educated class is emerging. It is bitter about social, political and economic conditions, is zealous to make improvements. The production curve may rise, but these young reformers know the income isn't trickling down to the poor. They may not approve of all aspects of the Cuban revolution, but they see much to admire, particularly its land reform and industrial program.

And there are other new factors. The new university class as well as its less-educated brothers are being bombarded by propaganda from Cuba and the Soviet bloc, encouraging revolution and anti—"Yanquiism." Slum dwellers who have fled starvation in the countryside are being confronted by the hard experience of economic inequality.

Soviet and Cuban agents are busy organizing active demonstrations. An alternative to dependence on the U.S. is being offered by the Soviet bloc, which has been granting economic credits to countries such as Argentina and Brazil, and signing barter deals.

These are the pressures at work in varying degrees throughout most of Latin America. How they find expression will depend on the situation in each country. These differ enormously.

Several Latin-American countries have governments that believe in economic and social reform and in democracy. Their chances of achieving both goals are uneven.

Hot Spots: Bolivia, for example, is teetering into the lap of the Communists eight years after its Revolution.

Mine and agricultural production has plummeted, while commodities are scarce and the country is being saved from bankruptcy only by heavy U.S. aid. Unschooled, suspicious Indians, who make up most of the population, refuse to leave their barren mountain plots for the rich land opened for them.

Miners, goaded on by the Communists, resist necessary layoffs, demand higher salaries, and strike.

The government of President Victor Paz Estenssoro has had to fight off attempted coups from the displaced oligarchy and to overcome Communist obstruction. Meanwhile, the Soviet bloc offers blandishments, and the ruling party is split between right and left. The situation is explosive.

Venezuela is another hot spot. President Romulo Betancourt tries to cope with the social and economic mess left over from the Perez Jimenez dictatorship overthrown in '58. But he must devote himself primarily to staying in power, fighting both attempted military coups backed by the old oligarchy, and the subversive activities of leftists.

Leaders of his own party grumble over the slow pace of social reform, and he may face a second crisis here—after already having lost a left wing. If he counters by shifting further left—even verbally—he risks a military coup. He

has a 50-50 chance to survive, and needs U.S. support to do so.

If Betancourt is overthrown, an unpopular rightist group would likely take over, and then soon be replaced by a really radical leftist group.

Settling Down: Argentina, businessmen like to say, is on the right track. To put the country back on its economic feet after the Peron regime, President Arturo Frondizi launched an unpopular austerity program after he took office in '58.

It has stabilized the foreign exchange rate, but has been less successful in curbing domestic inflation. It has virtually halted growth and delayed needed improvements in transportation, housing and diversifying export industries.

Frondizi has thrown open his country to foreign investors. This and austerity aroused opposition and strikes, in part Peronist and Communist inspired.

To carry out his program, he has needed the Army's support, which brings its own problems. But after several shakeups, which nearly unseated him, Frondizi seems to have reached a balanced working relationship with the Army.

Peronist influence seems to be waning. Argentina still has 5 million "have nots" in its population of 21 million. But the support of the 6-million-strong middle class and the Army are expected to provide stability even if tangible economic gains are not made soon.

Bright Spots: Brazil and Mexico are the two big bright spots in Latin America. They come closest to satisfying the

popular demand for progress. Whether they come close enough time will tell. Both have low per-capita incomes, large numbers of poor Indians, large tracts of land to conquer, pressures from the left.

President Juscelino Kubitschek pushed Brazil's growth at the price of inflation. When his successor, Janio Quadros, came into office this year, he was forced to cut back. But he is cutting into fat as much as possible, mopping up waste and sweeping out corruption. Progress continues, and with it social reform.

Quadros dismayed some Americans by his assertion of an independent foreign policy, including making trade deals with the Soviet bloc and recognizing Russia. But he believes in free enterprise, associates himself with the cause of the West.

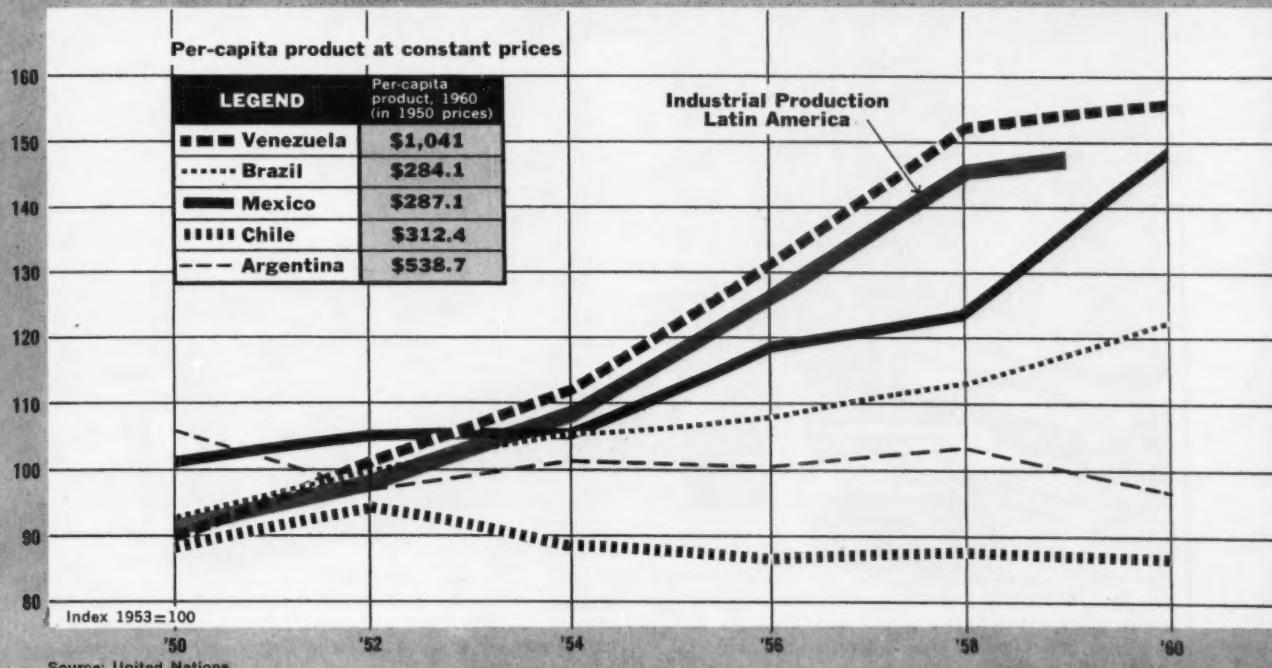
Mexico, despite all the talk about "Mexicanization" and anti-Yanqui demonstrations, is still one of the most promising investment prospects in Latin America. Its economic growth rate is second only to that of Venezuela, and its development has been far more balanced.

In the two years President Lopez Mateos has been in office, he has stepped up the pace of nationalization.

But Mexico still is eager for foreign investment within its rules, which generally exclude foreigners from basic industries and discourage their holding majority interest in any industrial ventures.

Mexico's economic improvement, and the flexibility of its one-party government (the ruling PRI party is being influenced by its younger, liberal economists) seem good

Industrial Progress — But Real Economic Growth Still Lags

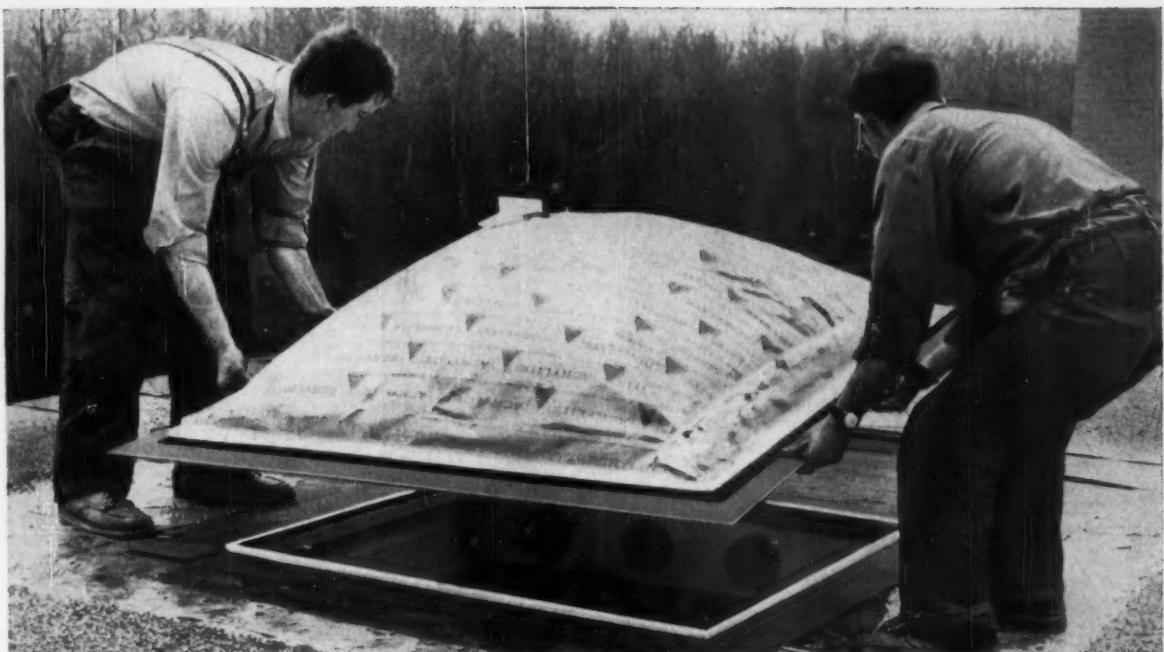


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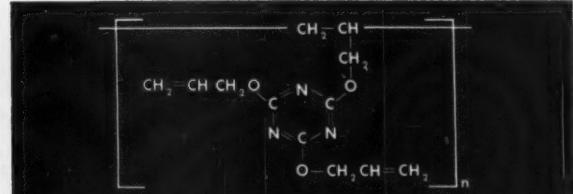
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LATIN AMERICA

SPECIAL REPORT

omen of political stability.

Elsewhere in Latin America, the prospects are not so bright as in Mexico, Brazil and Argentina, nor generally so immediately explosive as in Venezuela or Bolivia. Except for Costa Rica and possibly Uruguay, severe trouble may erupt if the social and economic problems aren't solved.

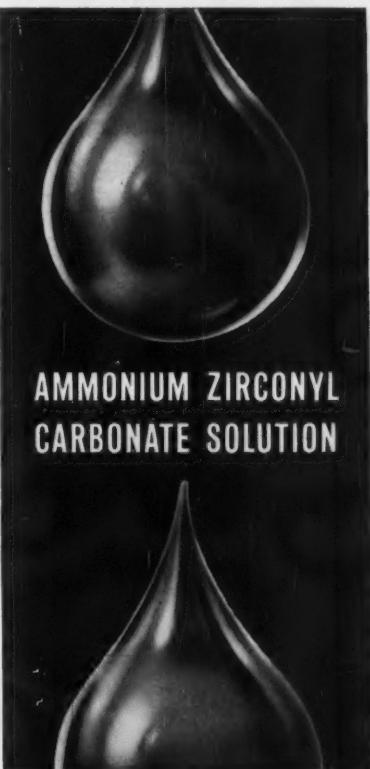
Planning the Key: At the Punta del Este meeting, one strong theme will predominate—the need for economic planning. The meeting will reflect a major change in U.S. policy, represents a victory of the ideas of the UN's Raul Prebisch, among others.

Prebisch believes foreign and domestic private investment is necessary, but must be made under priorities to prevent the imbalance characteristic of most Latin-American countries today. This has to take into account the import and export patterns that will develop, and the balance between investments leading to saving manpower and those absorbing it. He would also limit the freedom of foreign companies to compete with local companies, keeping them on an even footing.

Prebisch and others also oppose the orthodox economic stabilization policy preached by the International Monetary Fund. It has been the rule by which the U.S. has loaned money to bail countries out of foreign exchange difficulties, involves measures like balancing budgets, devaluating and simplifying exchange rates, cutting imports. It is not enough to fight inflation with monetary means alone, Prebisch says. This doesn't remove the bottlenecks which caused it in the first place, such as undeveloped export industries, insufficient local production, lack of basic needs like highways and power plants. Unless these basic problems are solved, inflation will start all over again once austerity is relaxed. Meanwhile, dangerous social tensions will have been created.

International agreements to regulate commodity prices will also be getting more play. This will probably involve the U.S. in pacts such as the International Coffee Agreement and may lead to a lowering of our trade barriers.

Trade integration will also be discussed. It is seen as a major need in solving Latin America's economic



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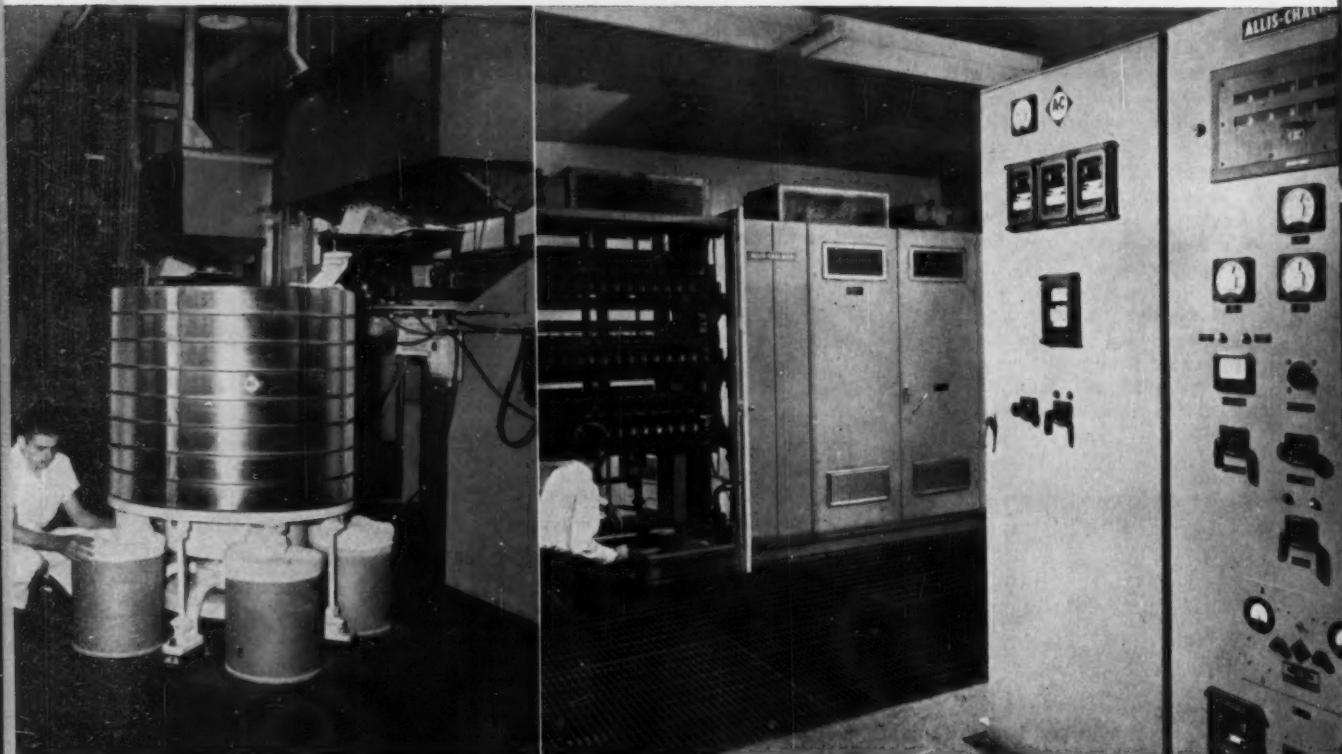
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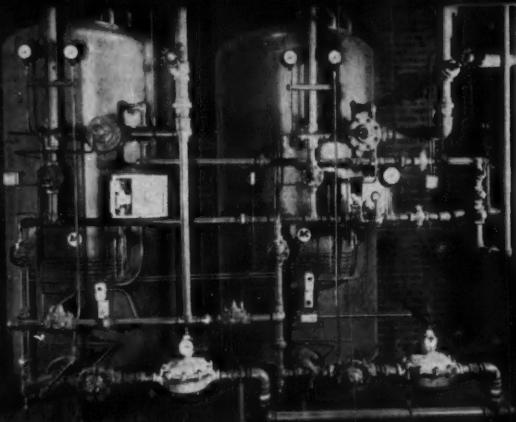
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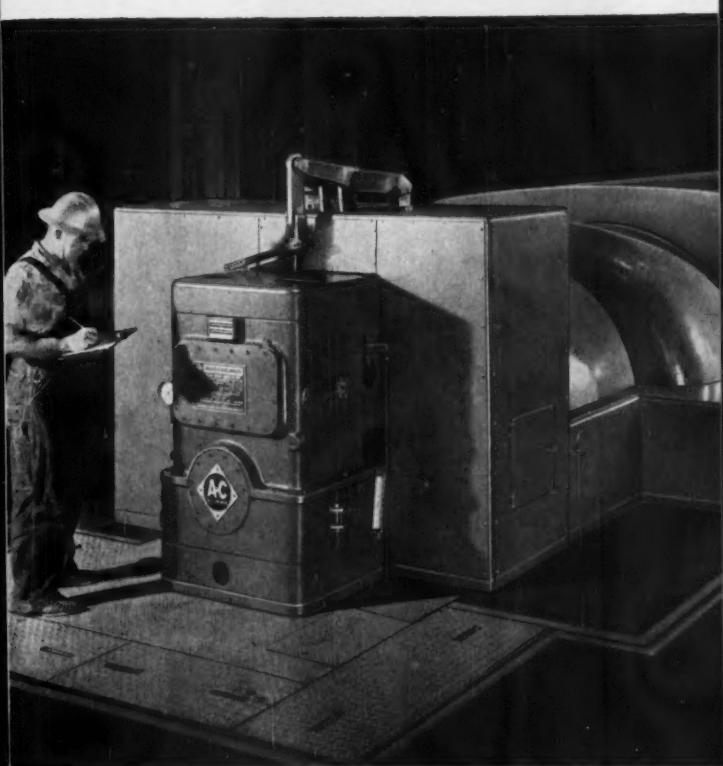
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LATIN AMERICA

SPECIAL REPORT

problems, by creating economically scaled markets and a more efficient division of industry.

On July 24, the Latin American Free Trade Assn. was inaugurated in Montevideo, Uruguay, following up on the treaty signed last year by Argentina, Brazil, Chile, Mexico, Paraguay, Peru and Uruguay. This is hailed as a "significant" step toward Latin-American economic integration, but its impact in the next few years at least will probably be almost negligible. It is full of loopholes. It calls for gradual removal of trade restrictions between the members during the next 12 years—but only on products now traded between them. That excludes 90% of Latin-American trade. A host of problems stand in the way of real trade integration, including payments, transportation, local aspirations. On the plus side is the growing sense of regionalism.

Meanwhile, the Central American states of Guatemala, El Salvador and Nicaragua put into effect on June 3 the General Treaty of Central American Economic Integration. It aims to create a common market in five years, as one of a group of treaties promoting economic and trade cooperation.

Two of the knottiest subjects to be discussed at the Punta del Este conference are tax and land reform—crucial prerequisites for economic advancement. So far, almost no significant progress has been made in this delicate field. Typically, the wealthy elite, which often controls legislatures, is not inclined to vote measures that would be personally costly. This raises the question of whether there can be real reform without revolution. U.S. officials take hope in the fact that their Latin-American counterparts are at least willing to talk about this sensitive subject. And there have been some hopeful beginnings.

The planners will also start working on approaches to other major problems—agricultural productivity, general and technical education, housing, health, roads, utilities, communications, etc.

Some subjects probably won't be discussed at the meeting, but they remain great roadblocks to any progress. Case in point: government corruption, which can debilitate the most

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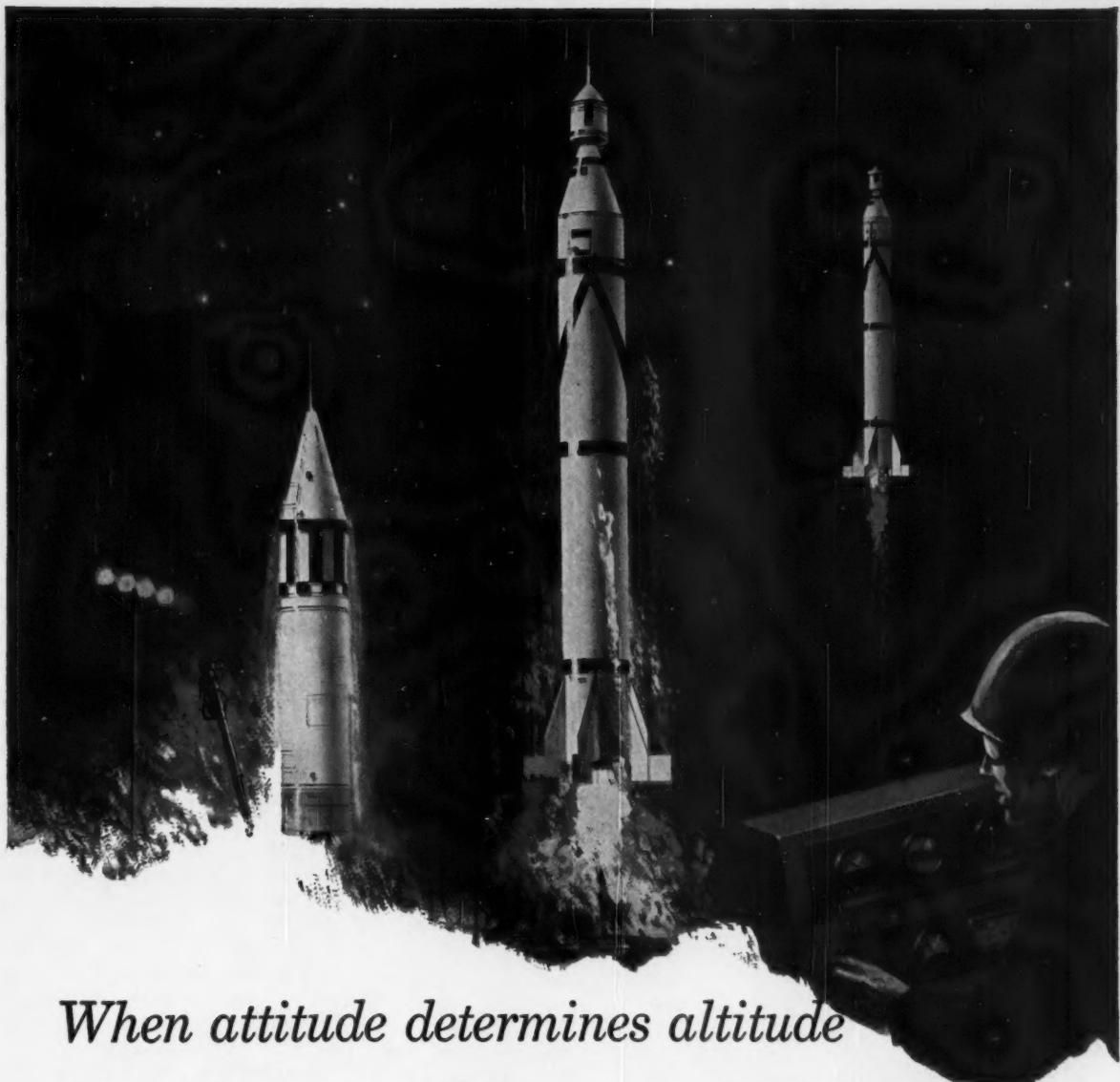
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LATIN AMERICA

SPECIAL REPORT

ambitious development plans. And the enormous expenditures on unnecessarily large armed forces—plus swollen pension lists of top officers—are serious economic drags. Civil Service ranks are wildly bloated, but capable personnel are scarce.

The biggest problem of all is where the money to pay for the program is going to come from. The U.S. will probably commit itself to at least \$1 billion/year, which won't be enough. Private foreign investment is also expected to help. And Latin America will have to invest a much higher proportion of its own income than it has so far.

This again runs into the problems of traditions—Latin Americans have a "low propensity to invest."

Some critics of sweeping social reform assert that redistributing income would be self-defeating. Taking money away from the rich and giving it to the poor, they say, would be taking it away from the savers and giving it to the spenders.

Prebisch insists that it is necessary to raise the income of the poor. At the same time, he says, it is crucial that this class be taught to save as its income improves. He notes that this redistribution of income would tend to cut the upper class luxury spending that is appropriate to more highly developed countries.

But even if all surplus and presently squandered funds are invested, Latin America would be able to finance only a small part of its needs.

President Kennedy is criticized for encouraging economic programs that may give governments too big an economic role. This could backfire and hurt U.S. investors, it's asserted.

But Latin America seems bound to push development with or without our aid. The most we can probably expect to do is help channel the effort along the paths most compatible with our own interests. The less aid that comes from outside, the less democratic will be the available means by which Latin America can harness its own resources.

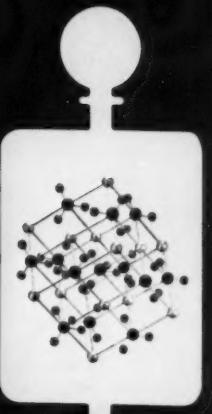
For Latin America as a whole, the outlook is discouraging. And if wholesale turmoil erupts, it's far from certain that the "bright spots" will be able to stay clear.

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WYANDOTTE CHEMICALS

COLOR

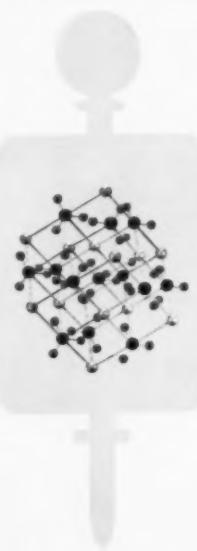
...and a Wyandotte key chemical for the paper-making industry

Color printing that captures an image *exactly* is a kind of miracle. But beautiful printing is so common today that it is taken for granted.

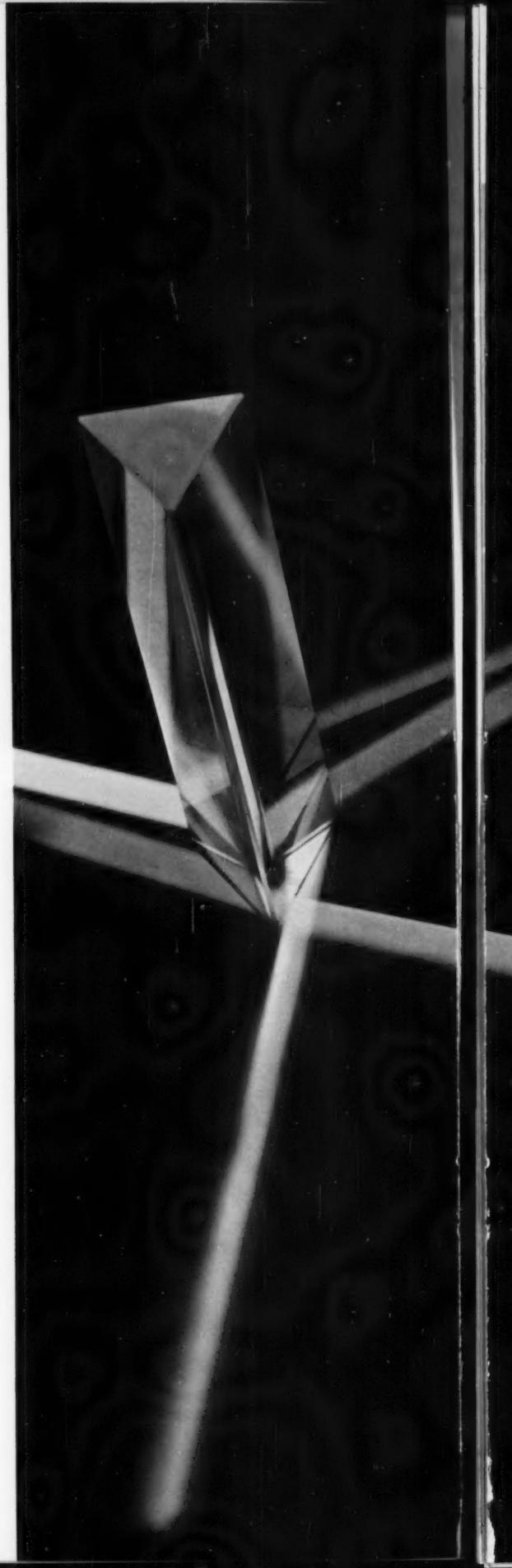
We at Wyandotte wouldn't have it otherwise. We have, in fact, helped make it so with Purecal®, a key chemical we developed as the result of close work with the paper industry.

This remarkable paper-coating pigment provides more whiteness and hiding power than any other in its price range. It also gives paper surfaces exceptional smoothness. The result is lightweight, low-cost coated paper that has the whiteness to bring out the brightness in colors, and the smoothness to pick up fine details at high press speeds. The paper you're looking at now contains Purecal in the coating . . . see what we mean?

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Key chemical: Many of the finest printing papers contain Wyandotte Purecal in their coating. One paper-maker recently opened up a whole new avenue of profits with a new paper-coating process made possible by Purecal. Write for details.



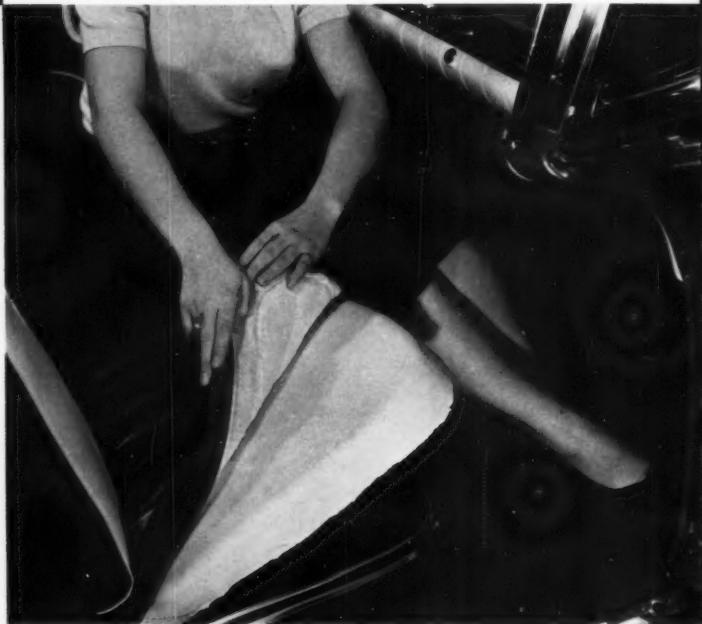


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OLD

Nitric acid oxidation of cyclohexanol characterizes the two adipic acid processes now in commercial use.

1. cyclohexane → cyclohexanol → adipic acid

Air oxidation of cyclohexane to a cyclohexanol-containing mixture, followed by nitric acid oxidation of the cyclohexanol.

2. phenol → cyclohexanol → adipic acid

Hydrogenation of phenol to a cyclohexanol-containing mixture, followed by nitric acid oxidation of the cyclohexanol.

NEW

Air oxidation of a cyclohexanone-cyclohexanol mixture is key to process developed by Scientific Design.

- cyclohexane → cyclohexanone/cyclohexanol → adipic acid

Air oxidation of cyclohexane yields cyclohexanone-cyclohexanol mixture, which is subjected to another air oxidation.

User	Est. capacity million lbs./year
Du Pont	200
Chemstrand	210
Allied	20
Monsanto	20

Rohm & Haas	20
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Adipic: Captive Chemical Liberated

Rohm & Haas — completing plans for a 20-million-lbs./year adipic acid plant at Louisville, Ky. — will soon become the U.S.'s fifth producer of the chemical. Its new air oxidation process was developed by Scientific Design (New York). How R & H ranks with existing producers is shown in the table above.

Significance: the bulk of adipic acid has been consumed captively by the four producers, mostly in nylon-6/6 operations; but because Rohm & Haas' production is not all captive its output will represent a new source of open-market adipic, will help to free the chemical from captive-use bonds.

The new plant should thus further the trend toward use of adipic as a chemical intermediate. Open-market sales of adipic acid, according to the U.S. Tariff Commission, increased from 24.5 million lbs. in '58 to 34.1 million lbs. in '59. It's estimated that demand in '60 for the 31¢/lb. chemical hit 40.3 million lbs.

Moreover, if the SD process proves

out commercially, it may find favor with other potential independent producers who wish to gain a foothold in a growing market.

Adipic acid is said to have big possibilities as an intermediate because it suggests products in many fields. Some of the more promising jobs: in textiles (as a treating agent); food acid (replacing citric acid as a flavoring agent); anthraquinone dyes (coloring various polymers by reacting adipic acid with amino propyl ether and formaldehyde and a diazonium compound); metallurgy (forming a flotation agent for ores of copper, zinc, lead); and insecticides (via formation of adiponitrile, a derivative of adipic acid).

Right now, the over-all supply picture shapes up this way: four producers — Du Pont, Allied Chemical, Monsanto and Chemstrand (a subsidiary of Monsanto) together are estimated to produce upwards of 450 million lbs./year. Nylon-6/6, a polymer of adipic acid and hexa-

methylene diamine, accounts for 400 million lbs./year of adipic. Practically all of Du Pont's and Chemstrand's output is consumed captively in nylon-6/6 operations.

But Monsanto and Allied are believed to be using part of their adipic acid as an intermediate for such diverse applications as plasticizers, vinyl polymers, urethane elastomers, coatings. They also sell a part of their output on the open market. This contributes to a large portion of the sales reported by the Tariff Commission.

Rohm & Haas intends to use most of its adipic output from the new plant to make, among other things, such products as synthetic lubricants and plasticizers. And, like Allied, Du Pont and Monsanto, it will sell the chemical on the open market.

Process Details: Relatively few adipic acid processing details have been revealed. However, two basic routes are now in use—the Du Pont process starting with cyclohexane

(which is also employed by Imperial Chemical Industries in England, and probably by other foreign firms) and the phenol method.

Originally, in '39, Du Pont had a phenol process utilizing air oxidation. In the early '40s it switched to benzene and cyclohexane, employing air oxidation. The process now in use is based on air oxidation of cyclohexane, followed by nitric acid oxidation. This process is licensed to Chemstrand, is used in both firms' commercial operations.

Processes starting with phenol were developed independently by Monsanto and Allied Chemical. Although the processes are basically similar, the companies' full-scale plants are undoubtedly different. Monsanto, which had its process before acquiring Chemstrand, thus has two methods. Allied's process is reportedly an outgrowth of its caprolactam operations.

Like Allied's, Scientific Design's process is reported to stem from corollary work — in this case, on liquid-phase oxidation. SD's list of liquid-phase oxidation processes, licensed or handled, includes phthalic anhydride, phenol, cyclohexanol, cyclohexanone, terephthalic acid and isophthalic acid. SD has no comment on this point but

does emphasize that the new route has no relation to the dibasic acid processes licensed by Mid-Century. (Mid-Century was formerly an affiliate of SD, is now a 100% subsidiary of Standard Oil of Indiana.)

The Du Pont Process: Formerly, the Du Pont process started with impure cyclohexane (70-80% purity) from a refinery. But since refineries have upgraded cyclohexane, the process now starts with commercially pure cyclohexane (98% purity). This liquid feed is mixed with a cyclohexane recycle and a trace of cobalt naphthenate catalyst, fed to a series of oxidizing reactors, where it is treated with air at 260-330 F and about 200 psi.

The reaction is controlled to give conversions of 5-12% of cyclohexane, with corresponding yields of 65-85% of adipic acid, based on cyclohexane. The resulting adipic acid precursors are separated from water, recycle cyclohexane and impurities by distillation.

In the final phase of the process, the intermediate oxidation product is fed to reactors, where it is oxidized to adipic acid with approximately 60% nitric acid at about 180 F. Nitric oxide vapors escaping from the reactors are recovered. The adipic acid is separated from the reactor effluent as a water layer immiscible with the unreacted oils. The adipic acid is recovered from this water layer through crystallization and centrifuging.

The Phenol Process: Phenol is mixed with palladium catalyst and passed to a hydrogenation vessel, where it is agitated with hydrogen gas at about 300 F and 50 psi. The product, cyclohexanol, is carried overhead as a vapor with excess hydrogen. It's then sent on to the nitric acid oxidation step.

The SD Process: While little is known about SD's process, one of its features is indicated in Australian patent application 61570/60, where a temperature of 268-275 F is specified for the first air-oxidation step to control composition of the intermediate products. By thus controlling the cyclohexanol/cyclohexanone ratio, the process is able to bypass the costly purification steps for separating the cyclohexanone for air oxidation, according to the patent application.

Cyclohexane, in liquid form, is fed into a stainless steel reactor, where it is mixed with cobalt naphthenate cat-

alyst and oxidized with air until about 8-10% of the contained cyclohexane is converted. The resulting liquid effluent, containing more cyclohexanone than cyclohexanol is passed to a distillation column, where the unreacted cyclohexane is separated for recycle.

SD uses air oxidation in the second step. From a commercial point of view, this is probably the top feature of the process. It avoids nitric acid consumption entirely, and the concomitant problems of handling nitric acid. And since it begins with cyclohexane, it avoids phenol's price premium as a starting material.

In SD's second step, the liquor is mixed with copper and manganese catalyst (as salts in an acetic acid solvent). The cyclohexanol and cyclohexanone are air-oxidized to extinction. Adipic acid and solvent are separated as a water layer from unreacted cyclohexane oils. Then they are crystallized, purified and centrifuged into adipic acid product.

SD's executive vice-president, Ralph Landau, declines to reveal exact cost details on the process but says it is "highly competitive" for small plants (about 20 million lbs./year). He indicates that for large plants there is a size factor that could limit its advantage.

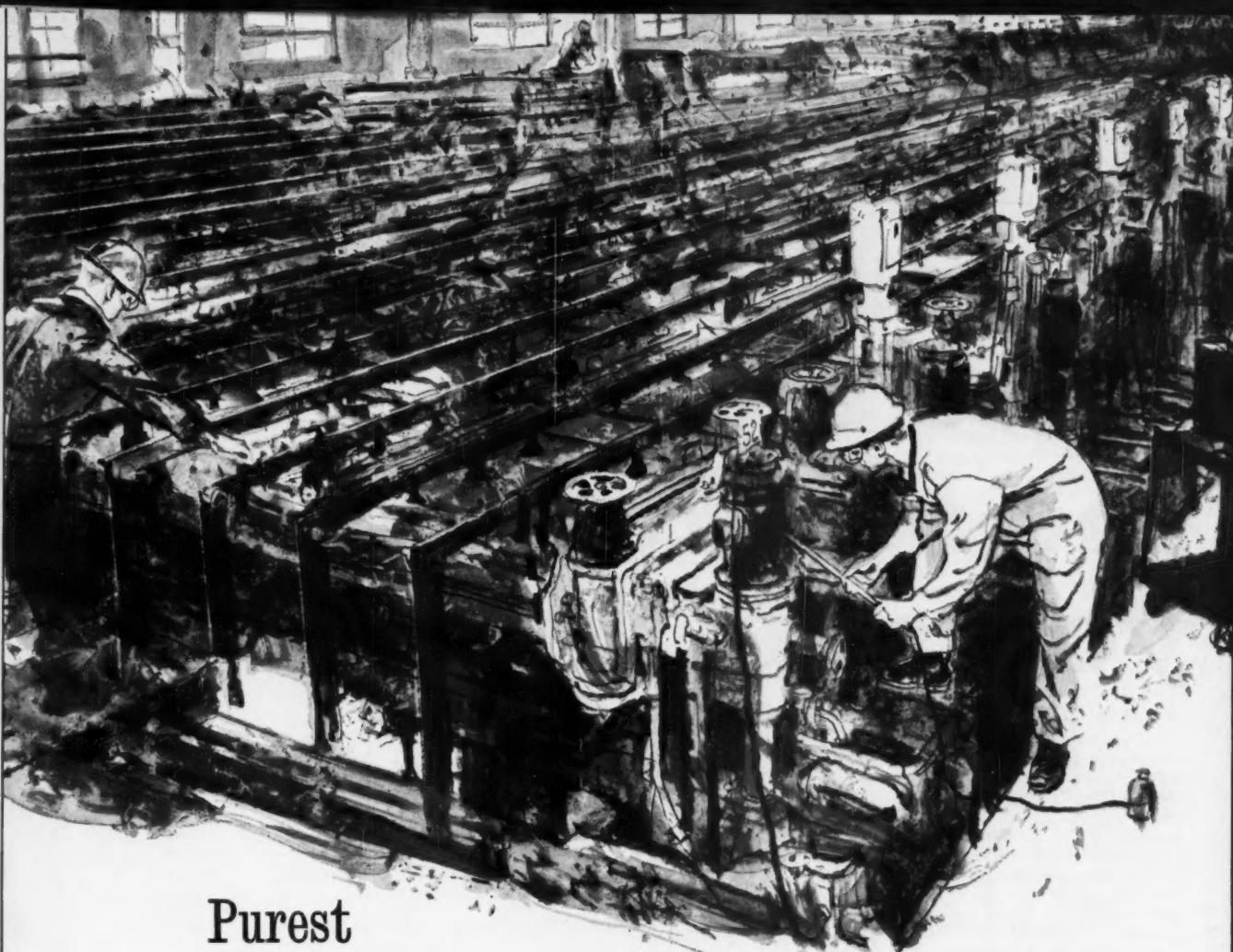
Patent Pattern: Adipic acid's history can be traced by key patents that have issued over the years. They pinpoint major developments in plant operation, feedstocks, intermediates and yields:

- The basic air oxidation route to adipic acid was first developed by I. G. Farbenindustrie in '33 (U.S. Patent 2,005,183). In this patent, now expired, the cyclic 6-carbon cyclohexanone is oxidized to adipic acid with air in a chrome-nickel steel vessel. Catalysts are polyvalent metals with atomic weights 50-200 (vanadium, chromium, manganese, cobalt, etc.). These catalysts appear in most of the subsequent patents.

- Du Pont originally studied adipic acid processing along two different routes. One route (U.S. Patents 2,196,357, 2,291,221 and 2,343,534) used nitric acid oxidation all the way, with a recycle of intermediate products after a first oxidation step. But the alternate, using air oxidation in the first step and nitric acid oxidation in the second, won out (U.S. 2,223,493, 2,223,494 and 2,321,551). The



SD's Landau: His firm introduces a new process for adipic acid.



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latter process is the principal basis for present-day Du Pont adipic acid plants.

• Du Pont made an important advance when it discovered that petroleum refiners' standard cyclohexane cut from ordinary distillation could be substituted as feedstock for pure cyclohexane (U.S. Patent 2,557,281). Reason: the materials boiling with cyclohexane (methyl cyclopentane, isooctanes, etc.) break down in the air-oxidation reaction and are easily removed. They form an azeotrope with benzene, help take out this impurity. Du Pont now buys the standard, commercially pure grade of cyclohexane for its adipic acid production.

• Patents issued in the last few years (e.g., U.S. 2,851,496 to Du Pont) indicate that the critical difference between today's three processes lies in the precursors to adipic acid, the cyclohexanone and cyclohexanol. If the second step of oxidation is by air, then cyclohexanone is preferred — if by nitric acid, the composition is less important.

• An Allied Chemical patent (U.S. 2,857,432) suggests the relation between Allied's adipic acid process and its caprolactam production. The patent covers production of cyclohexanone, which is an intermediate in caprolactam manufacture. But it also discusses the separation of by-product cyclohexanol, which Allied's National Aniline Division is reported to use for nitric acid oxidation to adipic acid.

• Latest entry, Scientific Design's Australian patent application, suggests operating conditions that control the cyclohexanone/cyclohexanol weight ratio in the second oxidation step. It says that a cyclohexanone/cyclohexanol weight ratio of at least one-to-one will increase yields by 18-52%.

Outlook: Until more patents on SD's process issue, however, it's impossible to point with assurance to its key features. And until a commercial plant is running smoothly, neither can the economics be pinned down. However, Rohm & Haas' choice of SD's method offers evidence that the company is convinced the process will prove competitive with existing adipic acid units. Moreover, the new plant should spur diversification of adipic acid as a chemical intermediate. Merchant sales have grown from about \$7 million to \$12 million in three years.

High-Purity Freeze

A new zone-freezing technique for purifying a wide range of organic chemicals has been developed by Quantum, Inc. (Wallingford, Conn.). The process is continuous, has been proved out at temperatures ranging from -60 to +120 F.

The company believes the new method is especially suited for use where ultrahigh purity is a prime goal; and it feels that the process will prove competitive with distillation in many commercial applications.

The Quantum process is different from both the zone-melting process used for purifying silicon and the zone-freezing processes used to desalt sea water. All of these methods use only one freeze (or melt) for each pass through the process. The Quantum method includes a number of stages. Each successive stage yields a higher-purity product. A liquid recycle between the stages returns impurities to a "bottoms" zone, much the same as intermediate reflux carries back impurities in conventional distillation.

Key to the new process is a series of slots, design of which has not been revealed. These slots separate the ice crystals formed in each stage from a residue liquid and move the crystals on by pressure to the next stage.

In operation, the system resembles a batch distillation column. Feed from a surge tank is fed through a pump to the bottom, where it is immediately chilled, converting essentially all of the desired product (along with a percentage of impurities) into crystals. These crystals, forced through the special slots, meet a warm stream of internal liquid recycle in the first melting zone. At the same time, the liquid left from the freeze in the bottoms zone is returned to the surge tank.

Above the first melting zone, the process is repeated. The liquid is again partly frozen; the crystals separated and forced upward. The process is repeated for the number of stages required to give the desired purity.

This system is said to bring five significant improvements to chemical processing techniques:

- (1) It will make separations that cannot be made by high-temperature distillation because of thermal decomposition of the product.
- (2) In some instances, it can lower

refining costs, since the heat required to take liquids from room temperature to freezing is less than the heat required to vaporize them.

(3) It can be operated continuously.

(4) It can boost the purity range of existing commercial grades of organic chemicals.

(5) It offers a semicommercial tool for obtaining ultrahigh purities heretofore unavailable.

Although its full range of applications is still to be determined, the process has proved successful with a wide range of organics, including benzene, cyclohexane, acetic acid, acrylic acid, *p*-cresol, formic acid, glycerol, phenyl hydrazine.

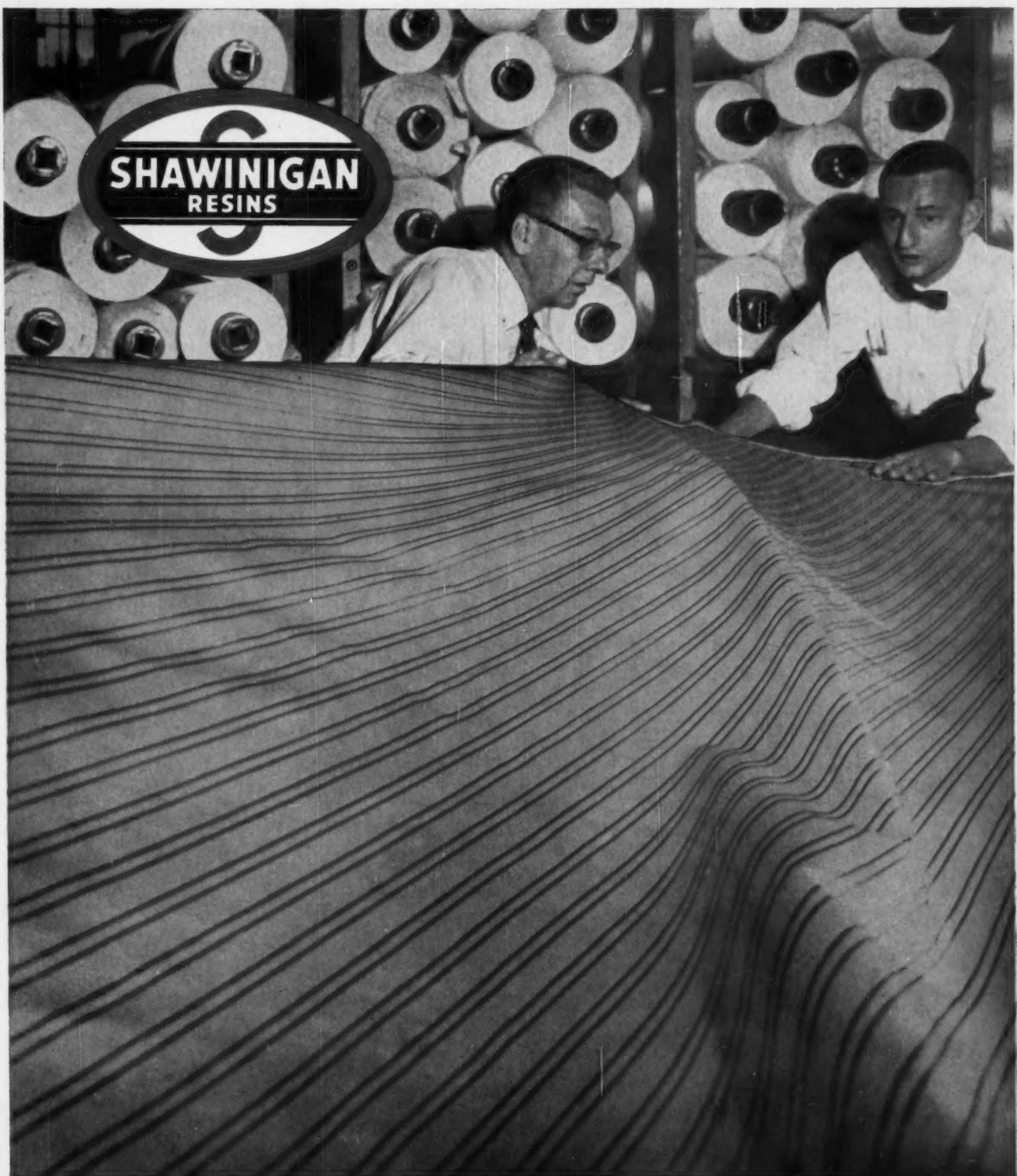
It has one limitation: it cannot be used for eutectic mixtures that have a liquid temperature lower than the freezing point of the pure components. However, this type of composition is said to occur less than one time out of every 500 cases.

PROCESSES

Plutonium's By-Products: The flow of by-products from plutonium recovery has begun at the Atomic Energy Commission's Hanford, Wash., atomic plant. General Electric, which operates the Hanford plant for AEC, has sent shipments of partly purified strontium-90 and cesium-137 to AEC's Oak Ridge, Tenn., plant for final purification.

Strontium-90, a well-known beta ray emitter and long-lasting source of heat energy, will be made available to industry by AEC. Cesium-137, a gamma emitter, will be made available to medical centers for research and radiotherapy. Both of these elements are fission by-products, are recovered through chemical processing from the spent fuel elements of the Hanford reactors. The strontium-90 has been recovered and partly purified by batch precipitation followed by ion exchange.

Demonstrating Bagasse Pulp. Crown Zellerbach's Camas, Wash., Central Research Division has completed a pilot plant that the firm will use to demonstrate its process for making newsprint from nonwood fibers such as bagasse (*CW*, Feb. 4, p. 39). The demonstration unit includes a hydro-pulper, a depithing machine, and a continuous digester.



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August 5, 1961 CHEMICAL WEEK 89

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Two other buildings—just opened—complete the picture. *General Packaging Research and Development* brings together the paper, plastics and closure technologies of six product divisions and provides an ideal environment for the development of packages made of combinations of materials. And the new *Glass Research and Development* building will be devoted to an advanced technology for the world's oldest packaging material. This technical package adds one more reason why—

Continental has, and will have, the right package for you!

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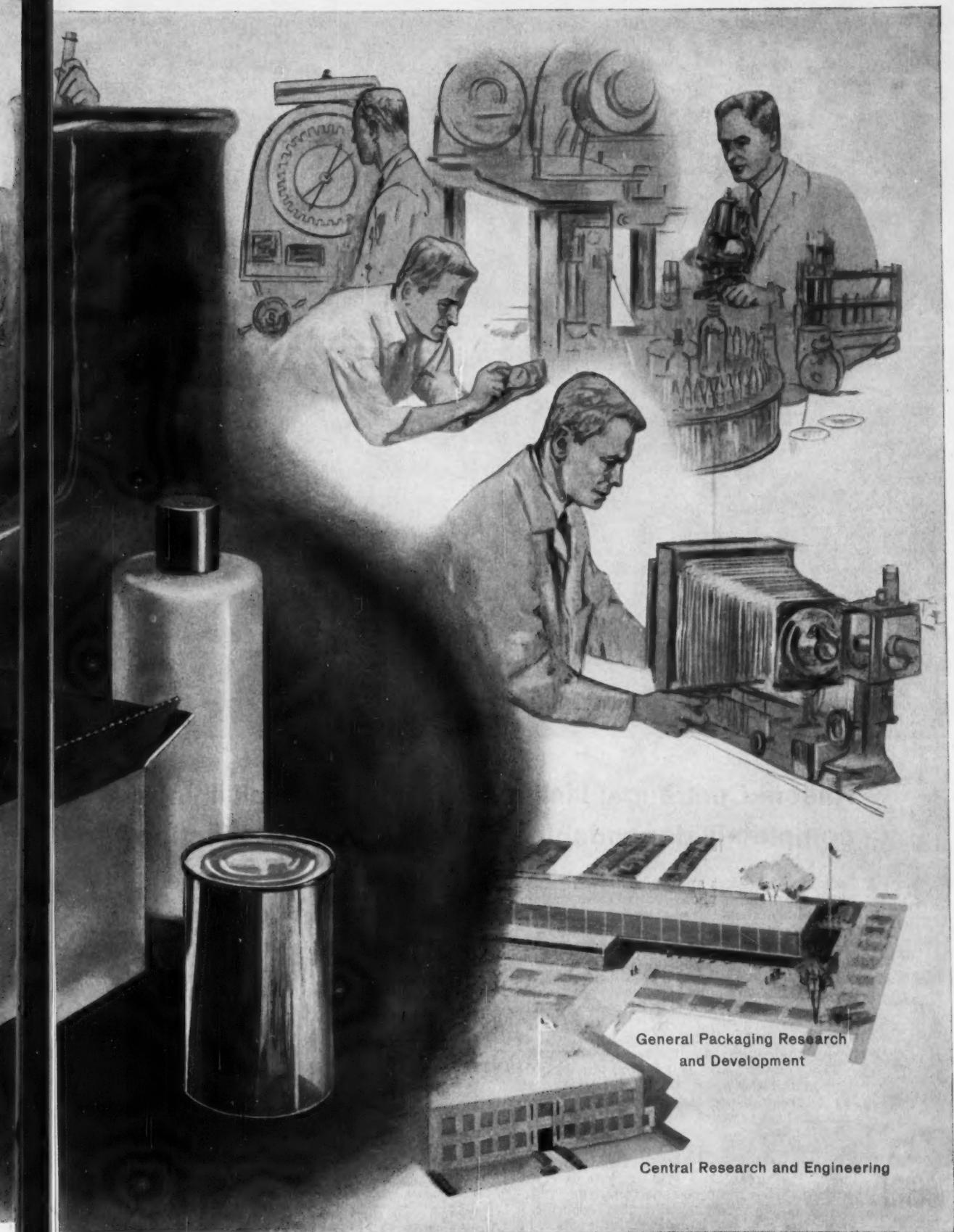
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Pail Interior Lined by Old Spray Gun Process



Pail Interior Lined by New Rheem Centrifugal Lining Process



Rheem Centrifugal Lining process makes pail linings completely dependable, for best product protection

Look at the blisters and pinholes in the untouched pail lining photo at top. On impact, the blisters may break, introducing foreign particles into the product. Or, pinholes will expose the contents to bare steel. Chalk up one pail of ruined product — and one unhappy customer.

Now, look at the section of pail lined by the exclusive Rheem Centrifugal Lining process. No blisters. No pinholes or skips. No globs or thin spots, either.

Rheem lined pails assure the same product purity on delivery as at filling. Here's why:

The Rheem Centrifugal Lining process, first method that's not merely an adaptation of painting techniques, operates by centrifugal force instead of air pressure.

Air turbulence is eliminated, allowing a uniform coating to be applied, even in the bead. Solvent content is reduced, minimizing pinholes. The grease and grit of hose lines are avoided. Since the process is completely automatic, human error is eliminated, assuring a lining free of skips, globs and thin spots. The

result is the best protection you can get for products packed in pails.

If you are now using pails lined by another process, or using packages of other basic materials, write for samples, information on linings, or a special testing program. Rheem Manufacturing Company, 1701 West Edgar Road, Linden, N. J. Plants across the country.



How It Works: Pail shells move up to automatic Centrifugal Lining equipment (left). Positioning arms clamp pail and (right) raise it past spinning centrifugal applicator head. Angle, distance and speed never vary. Result: completely uniform linings — completely dependable protection for your product.

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Big-Ring Compounds Make Their Bids

The two newest members of a growing family of large-ring compounds — those containing more than six carbon atoms in the ring (see table, right)—are currently looking for commercial development jobs. The two compounds are 1, 3-cyclooctadiene (8-carbon ring) and 1,5,9-cyclododecatriene (12-carbon ring).

These butadiene-derived intermediates are potential raw materials for a number of end-products — e.g., nylon fibers, molded plastics, coatings, adhesives, synthetic lubricants, high-energy fuels. Looking at it another way, they could represent a volume outlet for butadiene, if they catch on commercially.

The most promising opportunities for these large-ring compounds stem from two reactions: (1) ring splitting and oxidation to yield 8- or 12-carbon dibasic acids; (2) forming caprylolactam or the homologous 12-carbon lactam, which can be polymerized to the corresponding polyamides (nylon-8 or nylon-12).

Splitting the long-chain dibasic acids forms high-purity intermediates at relatively high yields. Ordinarily, similar compounds are obtained by extraction from natural products—e.g., suberic acid is obtained from castor oil at low yield. Availability of the pure compounds now gives research chemists more incentive for applications work.

The polyamides, nylon-8 or nylon-12, have one basic advantage over conventional nylon-6: lower water absorption (less than 1%). In injection molding, where nylon tends to swell, the long-chain polyamide would show better dimensional stability. This is important for industrial molded products that are used in high-precision applications.

In the U. S., only Cities Service Research and Development Co. (New York) now offers both of the compounds; Enjay Chemical (New York) makes 1,5,9-cyclododecatriene.

Other U.S. firms — e.g., Petrotex Chemical Corp. (Houston, Tex.), Shell Chemical Co. (at Torrance, Calif.), Phillips Petroleum Co. (Bartlesville, Okla.)—are also examining large-ring compounds. But so far they are evi-

Compound	Proved Chemical Reactions	Possible Applications
1,5-cyclo-octadiene	Behaves in most respects, as a typical unconjugated diene; with formic acid (and perchloric) it yields unexpected "transannular" products. Can undergo epoxidation, oxidation, Diels-Alder reactions; and it forms metal complexes. Can add to one of the two double bonds.	For use as an intermediate to make other 8-carbon rings; and as a multipurpose chemical intermediate.
cyclo-octene	Mainly undergoes the usual mono-olefin reactions: addition to the double bond, splitting of the bond or substituting of the adjacent hydrogens. Can be oxidized directly to cyclo-octene epoxide or to suberic acid, halogenated, oxonated, polymerized, alkylated or acylated.	May yield synthetic fibers and plastics; it can be used as an intermediate.
cyclo-octane	Major attraction of this well-studied chemical is that it can be converted into suberic acid and caprylolactam, thus nylon-8.	Polyamides, polyesters for fibers, plastics, synthetic lubricants, plasticizers and herbicides.
4-vinylcyclohexene CH=CH ₂	Forms a hydroperoxide from which adipic acid can be made; yields other acids, dialdehydes or diols.	Diepoxydine can be used to make polyesters, coatings, insecticides, drying oils. It can be copolymerized with olefins and diolefins.
1,3-cyclo-octadiene	Newest of these intermediates, its reactivity is largely unknown. The conjugated diene structure takes part in polymerizations, epoxidations, Diels-Alder reactions and oxidations.	Unknown as yet.
1,5,9-cyclododecatriene	The three unconjugated bonds make this unusually versatile; they can be singly or collectively put to epoxidation, oxonation, halogenation, hydrogenation. It can make a new polyamide monomer, 12-aminododecanoic acid lactam.	Plasticizers, resins, polyesters, lubricants and polymers.



Chemische Werke Huels' chemist examines first 12-carbon lactam.

dently letting Cities Service and Enjay pioneer the market.

The Germans are also doing considerable research in this field.

U.S. Action: Cities Service has developed its own large-ring technology. Almost all the other work on these compounds comes from Karl Ziegler's Max Planck Institute for Coal Research (Muelheim-Ruhr, Germany). Because Cities Service uses its own catalyst system, its 12-carbon compound differs from Enjay's. The former offers the *trans, trans, trans* isomer of cyclododecatriene. The product sold by Enjay and German companies has at least one *cis* bond. However, the advantages of the *all-trans* isomer are still not known.

Enjay got into dodecatriene production when its research affiliate obtained catalyst rights. Processes for both the 12-carbon ring and cyclooctadiene were developed by Ziegler's associate, Guenther Wilke. And patents are held by Studiengesellschaft Kohle mbH., a company founded by Ziegler to handle patents.

Start in Germany: Research on large-ring compounds originated in Germany in the catalytic synthesis of large compounds from acetylene (i.e., Reppe chemistry). This work included the bonding of four acetylene molecules to form cyclo-octatetraene

—a once-hazardous, still tricky task.

BASF is now working on a 12-carbon polyamide made from butadiene. It sells semicommercial quantities of nylon-8 (*CW*, April 15, p. 91) made from cyclo-octadiene, which BASF also makes from butadiene.

BASF does not sell commercial volumes of nylon-8 because its dimensional stability, while better than that of nylon-6, is not good enough to justify a price higher than that of nylon-6. A French firm, Soc. Organico (Paris), sells more than 1,000 tons/month of Rilsan, an 11-carbon polyamide made from natural castor oil derivatives. This product absorbs less moisture than the nylon-8.

However, nylon-12 made from cyclododecatriene is holding researchers' attention. It will be more desirable than nylon-11 and it could be the big outlet for butadiene. Still, because of market or production hurdles, BASF expects that its commercial production of cyclododecatriene will not start for four to six years.

Chemische Werke Huels AG. (Marl, Germany), which sells cyclododecatriene (*CW*, Oct. 3, '59, p. 50), is also researching nylon-12. This firm, like BASF and the French company, Rhone-Poulenc S.A. (Paris), has rights to the Max Planck Institute patents.

Process Routes: Both Huels and

BASF have their own cyclo-octadiene processes. They have applied Guenther Wilke technology in producing cyclododecatriene. The process for this 12-carbon ring involves trimerizing butadiene in a suspension of a catalyst in benzene.

It's claimed that dodecatriene poses difficulty for further processing, since all three double bonds react almost simultaneously. However, Cities Service's F. T. Wadsworth tells *CHEMICAL WEEK* he has succeeded in hydrogenating only two of the bonds. And he believes that the bonds could be treated separately in other reactions; this has been done extensively with the 8-carbon cyclics.

The German firms have had some success in treating only one double bond. They have epoxidized one bond of the dodecatriene, formed epoxy-cyclododecadiene; then, with catalytic hydrogenation under high pressure and with further catalysis by magnesium iodide, they have formed the lactam.

Cyclic Patents: Indicative of the Ziegler institute's wide-ranging studies in this field are three British patents it recently received. Issued to Studienges. Kohle, No. 860,377 is for the production of cyclododecatriene and other related products. The patent covers butadiene (or isoprene or piperylene), describes a reaction carried out with titanium or chromium halide that has been reacted with aluminum hydride or finely divided complex metal hydride.

No. 861,979 is for aldehyde and alcohol derivatives of the dodecatriene using carbon monoxide and hydrogen in the presence of an oxo synthesis catalyst such as dicobalt octacarbonyl.

No. 867,016 is also for making cyclododecatriene but with a catalyst consisting of a titanium halide and an aluminum trialkyl or dialkyl aluminum hydride.

University Work: Meanwhile, in the U.S. at least one university is researching large-ring compounds. Arthur Cope, of Massachusetts Institute of Technology, has worked with cyclooctatetraene, other 8-membered rings and 10-carbon rings. The current direction of his research is to examine transannular reactions—the influence of electron deficiency in the ring. With 8- to 11-carbon rings, the opposite bonds are close enough to each

The importance of follow-through in NH₃ and Nitrogen Solutions purchases

by Ray Funk

About the Author.

Follow-through is Ray Funk's specialty. He has been doing such work for 14 of the 23 years he has been engaged in sales work. For the last six years, Ray, as Product Distribution Coordinator, has devoted his time exclusively to customer service work on nitrogen products.

* * *

Follow-through on a sale is for the seller *not* the buyer. The ideal in this follow-through is to obviate the need for the buyer to do anything further after placing the order except to be ready to receive the shipment when it arrives. As a seller, we often

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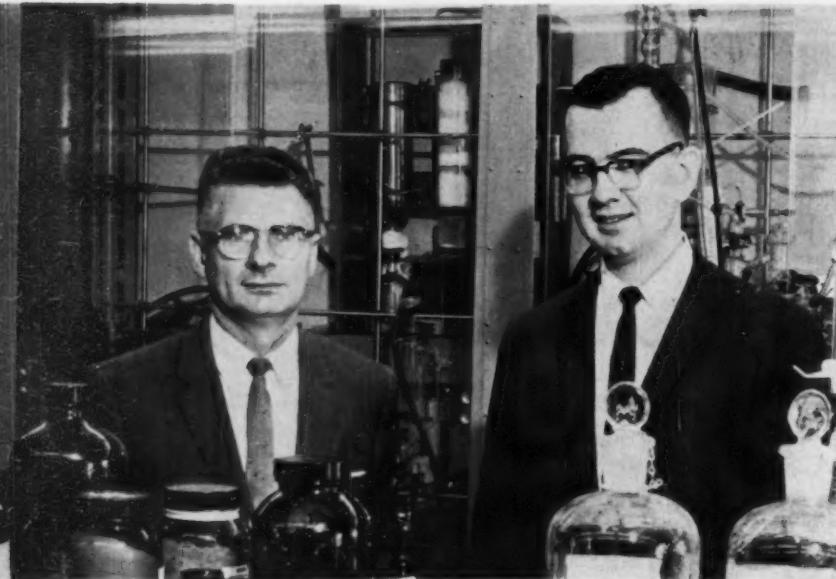
other for bridging or bonding across the ring. This opens the way to making a variety of new compounds.

Commercial Prospects: Cities Service is offering most of its 8-membered compounds at 50¢/lb. in developmental quantities. The dodecatriene is free for research studies. Projected price at full commercial output levels is about 25¢/lb. Enjay has not set its price as yet, but its dodecatriene is available in drum quantities.

Safety is to be considered in working with these cycloids; they may be hazardous if not handled properly.

For instance, cyclo-octadiene must be protected from air, heat and light because it forms potentially dangerous peroxides upon exposure.

The outlook for large-ring compounds varies. Some observers foresee use in making nylon and a variety of chemicals. But others, less optimistic, feel that the compounds will find only limited use as specialty materials. In any case, the amount of research effort under way in this country and abroad points up the belief held by a number of firms that the compounds offer plenty of potential.



Esso's H. K. Wiese (l.) and W. J. Munley did dodecatriene work.

PRODUCTS

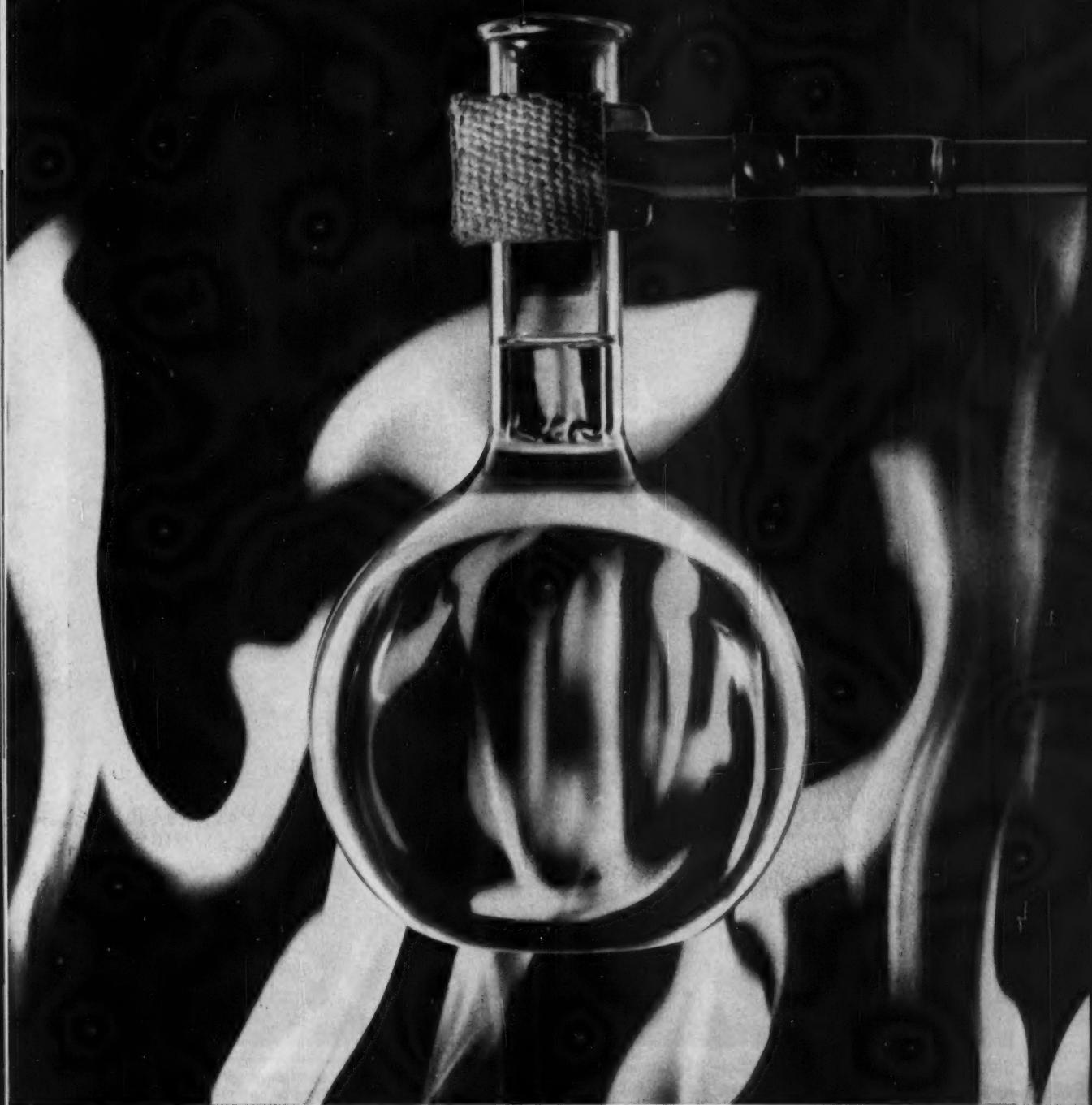
Antioxidant: Evans Chemetics, Inc. (New York), which specializes in organic divalent sulfur compounds, is making available thiadipropionic acid in commercial quantities. It works as an antioxidant or as a stabilizer and synergist for other antioxidants. The compound has Food & Drug Administration approval for use as a food additive. Another new chemical from Evans: thiolactic acid (2-mercaptopropionic acid).

Metatungstate: Chemical and Metallurgical Division of Sylvania Electric Products, Inc. (New York), is offering commercial quantities of alkali-free, water-soluble ammonium metatungstate, which may be used to prepare tungsten catalysts. It's also potentially useful for electroplating solutions and for a variety of reactions, including oxidation, hydroxylation, hydrogenation and polymerization. The product is the result of a new, proprietary production process. It is produced as a white crystalline powder, is extremely soluble in water and virtually free of metallic impurities.

Bio- and Radiochemicals: A group of three halogenated deoxyribonucleosides is now being sold by Schwarz BioResearch, Inc. (Mount Vernon, N.Y.): bromodeoxyuridine, bromodeoxyuridine and iododeoxyuridine. They're all in crystalline form, may be useful in studies of radiosensitivity of cells.

Organometallic: Ethyl Corp. is offering developmental quantities of ferrocene (dicyclopentadienyl iron) at \$10/lb. Suggested uses: combustion control additive, high-temperature lubricant, thermally stable and radiation-resistant polymers.

Ribonuclease: A new bovine ribonuclease of extreme purity is now being offered by Mann Research Laboratories (New York). Although crystalline ribonuclease is homogeneous according to electrophoretic and ultracentrifugal studies, it yields several different components when fractionated chromatographically. Mann Research has separated the active component from the crystalline material and this is now available as a salt-free dry ethanol precipitate.



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Water (wt per cent) max.....	0.10
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Technology Newsletter

CHEMICAL WEEK
August 5, 1961

A report on a new class of stable polymers was presented in Montreal this week at the Macromolecular Symposium sponsored by the International Union of Pure and Applied Chemistry. Two perfluoroalkyl oxetane polymers have been prepared by Purdue University's L. C. Case to add to the series previously reported (*CW, Oct. 15, '60, p. 108*). The new compounds are polymers of 2-heptafluoropropyl oxetane and 3-ethyl-3-nonafluorobutyl oxetane; both are viscous oils. They were found to be more stable at 150°C than a series of nonfluorinated polyethers. Research Corp. (New York) has applied for patents on the new materials, which might be potential competition to Hercules Powder's Penton—poly-3,3-bis(chloromethyl) oxetane—the only commercial polyoxetane on the market.

A tungsten alloy that can be rolled from ingot to sheet or tube has been developed by Oregon Metallurgical Corp. (Albany, Ore.). The key apparently is centrifugal casting, which produces an unusually fine grain size. The company has begun experimental production of tungsten-alloy strip, finds it rollable at considerably lower temperatures than expected. A 98% tungsten-2% molybdenum alloy was rolled from an as-cast thickness of 0.064 in. to 0.35 in. at 1832°F with no intermediate anneal or recrystallization. Oremet previously had cast pure tungsten nozzles (*CW Technology Newsletter, Feb. 25*).

Radio isotopic power will be used to operate an underwater seismographic station. The Atomic Energy Commission's Office of Isotope Development, Columbus University's Geographical Laboratory and Royal Research Corp. (Dublin, Calif.) are cooperating on a project that will place a 5-watt, cesium-137 generator on the ocean floor (2,500-3,000 fathoms below the surface) somewhere south of Bermuda. Work on fabrication of the generator started last month; it's scheduled for delivery in December and the station should start operating soon afterward.

Heat from the cesium-137 will be converted into electricity in lead telluride thermocouples at an over-all efficiency of 7% or greater. If the project proves out, the use of similar generators will probably get a tryout for other underwater work such as antisubmarine devices, nuclear explosion detectors and repeater generators for transoceanic cables. Reason: the sea is an ideal environment for isotopic power, offering a natural shield and incomparable heat sink.

A new process for simultaneously polymerizing caprolactam and casting the polymer into large shapes is making its bow this week. Polymer Corp. (Reading, Pa.), which is introducing the technique, sees it as enabling production of big nylon-6 molded shapes that will compete

Technology

Newsletter

(Continued)

with stainless steel and brass casting. Eventually, the firm expects to make products to compete with carbon steel.

Original work on the idea was done by Monsanto, which has several patents "broadly covering" the process. Polymer obtained exclusive rights in the U.S. and several other countries, has used it so far to cast semifinished symmetrical shapes of 500-700 lbs. Cast castings of the MC (monomer-cast) nylon now cost \$3.5/lb. But the company expects to halve that in the next several years.

The case for monomer casting: Raw-material costs for caprolactam are 46¢/lb.—instead of the 98¢/lb. required for nylon-6 molding powder. Moreover, MC nylon is cast at atmospheric pressure; the monomer polymerizes uniformly throughout the mold without formation of vacuum bubbles, thereby enabling production of pieces of theoretically unlimited thickness.

But there are potential drawbacks to the method. For one thing, control is tricky. Temperatures, catalyst additions and other variables must be controlled with great precision. Also, the method can't show off its potential economies on small parts. Polymer Corp. makes it plain that it does not expect the process to compete with injection molding for small parts where mold costs are low and injection cycles short.

A robot painter has been developed by Esso Research and Engineering Co. for painting smooth surfaces. It resembles a small Army tank with magnets inserted into the rubber treads; a pressurized roller applies the paint after the surfaces have been prepared by a mechanical chipping tool in one continuous motion. An operator with pneumatic controls directs the device, which is driven by an air-operated turbine connected to the treads.

The unit is designed to paint at a speed of 1.5 ft./second, will likely be tried out for painting big storage tanks or possibly ship hulls and decks. Esso engineers estimate that four robots could paint a medium-size tanker in 16 man-days, at a cost of \$7,500-14,000. Normally such a job would take 200 man-days, cost \$20,000.

A contract for development of "slurry fuels" for rockets has been awarded to Atlantic Research Corp. (Alexandria, Va.) by the Air Force Flight Test Center (Edwards Air Force Base, Calif.).

The firm will be working on a three-component system consisting of a liquid oxidizer, a metallic fuel and a material that will form a gas.

Although Atlantic Research has largely been identified with solid fuels, it has been working on multicomponent, or slurry, fuels for several years. The Air Force contract is for \$250,000.

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A circular map showing the city of Cincinnati, Ohio, with a star indicating its location. The map includes surrounding rivers and landmasses.

TAMPA, FLORIDA

A circular map showing the city of Tampa, Florida, with a star indicating its location. The map includes surrounding water bodies and landmasses.

NORFOLK, VIRGINIA

A circular map showing the city of Norfolk, Virginia, with a star indicating its location. The map includes surrounding water bodies and landmasses.

CARTERET, NEW JERSEY

A circular map showing the city of Carteret, New Jersey, with a star indicating its location. The map includes surrounding water bodies and landmasses.

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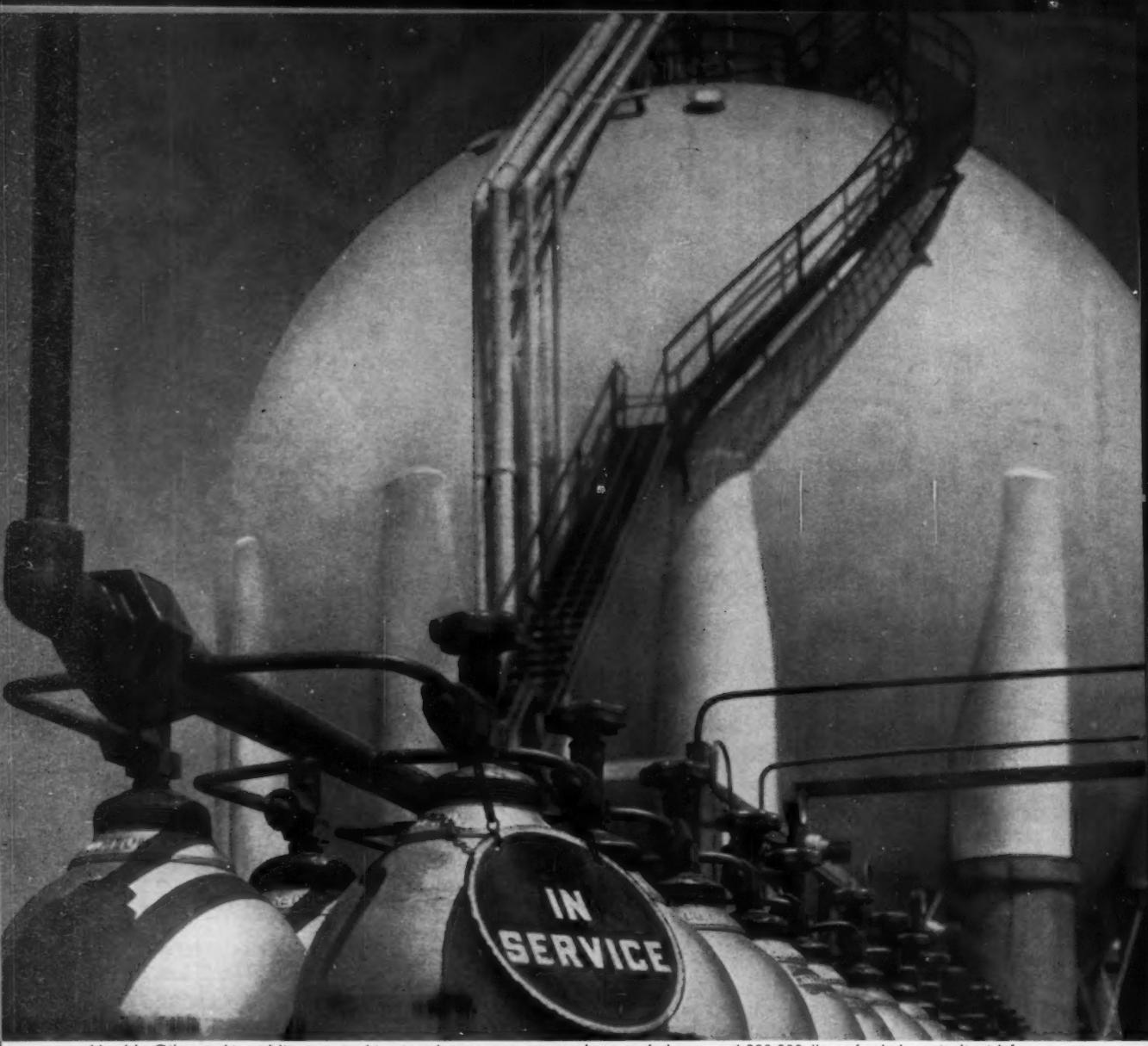


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insulation must be kept absolutely dry. This is why Humble Oil and Refining Company uses Airco's nitrogen to cut down its storage costs for this widely used petrochemical at Linden, N. J.

Nitrogen at Bayway Refinery is also used to blanket lube oil additives, to purge filters of explosive hydrocarbons and to handle powdered catalysts. Airco nitrogen answers all these needs.

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ADMINISTRATION

Manpower in the Top 20 Chemical-Producing States

	Employment			Payroll (dollars in thousands)		
	'58	'56	'54	'58	'56	'54
1 NEW JERSEY	81,267	84,220	81,731	\$483,515	\$464,841	\$399,783
2 NEW YORK	66,272	68,439	67,752	366,544	338,702	304,959
3 ILLINOIS	49,955	51,618	50,403	275,426	264,813	240,020
4 OHIO	47,384	47,688	42,826	270,152	245,816	195,101
5 PENNSYLVANIA	44,785	46,568	45,198	242,134	227,308	200,220
6 TEXAS	42,166	38,185	36,976	254,518	210,687	181,448
7 TENNESSEE	39,831	43,563	42,885	221,116	221,621	197,191
8 MICHIGAN	35,979	40,642	37,936	218,522	232,796	192,909
9 CALIFORNIA	35,806	35,464	31,579	205,180	186,687	152,373
10 VIRGINIA	31,111	34,037	34,977	157,849	156,690	146,443
11 WEST VIRGINIA	23,613	23,069	21,570	148,757	129,965	111,459
12 INDIANA	23,423	24,625	26,298	142,924	139,697	133,290
13 MISSOURI	18,104	18,726	17,890	96,139	86,630	81,300
14 LOUISIANA	17,133	16,918	17,479	100,469	90,252	83,893
15 MASSACHUSETTS	16,110	15,546	15,587	86,349	76,569	69,963
16 FLORIDA	14,741			66,645		
17 SOUTH CAROLINA	14,299	14,252	19,264	83,184	86,877	93,089
18 MARYLAND	12,953	13,693	12,724	61,442	60,173	51,631
19 NORTH CAROLINA	12,196	12,130	11,414	55,824	51,993	43,721
20 WASHINGTON	11,641	11,855	11,069	77,012	69,898	61,506

Chemical Producers Quickstep Southward

Preliminary figures of the U.S. Commerce Dept.'s '58 Census of Manufactures underscore the chemical process industries' continuing movement to the South and West.

Changes in the relative positions of selected states reflect the trend. In terms of employed chemical manpower, Florida now finds itself in the upper ranks. Connecticut, on the other hand, has dropped out of the top 20 in both chemical employment and output.

The new data puts Connecticut's chemical employment at 9,058. Payroll: \$50.1 million. Value added by chemical manufacture: \$127.1 million. The '56 survey (*CW, Oct. 25, '58, p. 108*) pegged employment at 11,131. Payroll: \$44.6 million. Value added by chemical manufacture: \$153.6 million.

Florida also gained rank in terms of output, moving up from 19th position in '56 to 15th in '58. The state's

value-added-by-manufacture total jumped 51% in the same period. Slower progress by Massachusetts, Kentucky and Maryland and an abrupt slump by South Carolina put Florida ahead of these states for the first time.

Texas edged past Michigan and Tennessee to become the sixth-ranked chemical state employer, but gave ground to New York in output, dropping from second (behind unchallenged New Jersey) to third.

North Carolina replaced Connecticut among the output elite, bringing to 10 the number of Southern states in the top 20. These 10—Texas, Tennessee, Virginia, West Virginia, Louisiana, Missouri, Florida, South Carolina, Kentucky, North Carolina—accounted for 35.3% of the total value-added-by-manufacture of the top 20 states (\$3.87 billion out of \$10.9 billion).

The nine Southern states among the leading 20 chemical-producing states in '56 shared 31.3% of that group's value-added total. And in '54 eight Southern states in the top 20 could muster only 28.7% of the value added by the top group (*CW, Sept. 8, '56, p. 50*).

Leading Chemical Communities: The top 20 cities are actually standard metropolitan statistical areas, based on definitions from the Commerce Dept.'s standard industrial classification manual. In '58, as in previous years, the New York-Northeast New Jersey area remained clearly in front of all others. But there were some changes in the rankings of several other areas, compared with '56. Chicago and Philadelphia clung to second and third place, respectively. Cincinnati climbed from seventh to sixth place. St. Louis (seventh) forged ahead of Houston (eighth). Cleveland

Output in the Top 20 Chemical-Producing States

Value Added by Manufacture (dollars in thousands)

	'54	'56	'58
1 NEW JERSEY	\$1,446,573	\$1,354,930	\$1,121,765
2 NEW YORK	1,222,149	979,101	872,140
3 TEXAS	1,063,313	1,020,881	722,056
4 ILLINOIS	868,058	785,368	663,669
5 PENNSYLVANIA	706,359	714,086	510,561
6 OHIO	698,213	698,546	566,366
7 CALIFORNIA	603,849	522,811	424,136
8 MICHIGAN	602,728	560,759	497,024
9 TENNESSEE	542,104	491,636	454,064
10 INDIANA	498,778	430,295	343,491
11 VIRGINIA	459,425	459,808	435,655
12 WEST VIRGINIA	397,049	412,066	316,922
13 LOUISIANA	315,866	291,170	250,238
14 MISSOURI	275,930	262,611	225,617
15 FLORIDA	236,053	156,333	80,684
16 SOUTH CAROLINA	233,049	337,490	148,166
17 MASSACHUSETTS	229,311	192,811	186,543
18 KENTUCKY	201,485	192,433	143,673
19 MARYLAND	192,930	169,137	146,634
20 NORTH CAROLINA	149,306	—	—

The Top 20 Chemical-Producing Cities

Value Added by Manufacture (dollars in millions)

	'58	'56	% Change
1 NEW YORK-NORTHEAST			
NEW JERSEY	\$1,835	\$1,657	10.7
2 CHICAGO	608	591	2.9
3 PHILADELPHIA	542	487	11.3
4 NEWARK	518	—	—
5 LOS ANGELES-LONG BEACH	348	301	15.6
6 CINCINNATI	259	239	8.4
7 ST. LOUIS	257	273	-5.9
8 HOUSTON	255	291	-8.1
9 DETROIT	240	229	4.8
10. BUFFALO	227	218	4.1
11 PATERSON-CLIFTON-PASSAIC	185	—	—
12 LOUISVILLE	180	187	-3.7
13 SAN FRANCISCO-OAKLAND	175	160	9.4
14 INDIANAPOLIS	157	—	—
15 JERSEY CITY	155	—	—
16 BALTIMORE	152	134	13.5
17 CLEVELAND	150	184	-18.5
18 BOSTON	125	103	21.3
19 MINNEAPOLIS-ST. PAUL	120	83	44.5
20 KANSAS CITY, KAN.-KANSAS CITY, MO.	110	99	11.1

dropped from 11th in the '56 rankings to 17th in '58.

Southward Ho: Commerce's '58 census is clear evidence of the lure the South and the Southwest continue to hold for the chemical process industries.

One reason: the active part Southern civic groups are taking in seeking to attract new industry (*CW*, May 20, p. 69). They help hold down land costs, taxes and labor problems—im-

portant factors for growth-minded management.

While traditional centers for chemical manufacturing continue to show some gains in most cases, the sharp increases in manpower and output are mainly in the South. This trend has been apparent for some time. And for the near-term future, at least, it will be a good clue to management's thinking on both choice of new plant sites and expansion of facilities.

Costly Advice

A recent court decision has put labor unions on notice that they may be liable for unsound advice given their members during strikes.

A district court jury in Stinnett, Tex. (Hutchinson County), has ordered payment of \$1.2 million by the International Union of Operating Engineers and Local 351 to 28 union members—all former employees of Phillips Petroleum Co. plants in Borger, Tex. The award is for loss of wages incurred as a result of their being dismissed by Phillips because of advice given strikers by the union.

When the strike against Phillips was called in May and June, '58, Phillips put out a written notice telling employees the company intended to operate plants and not to shut them down. In the court case just concluded, the jury found that union officials ordered their members to walk off the jobs on strike, but first to shut down the plant in "any way you have to," before leaving. It was this point of shutting down equipment against company orders which prompted Phillips to fire the men.

The plaintiffs then sued the union for giving them such advice as to cause them to permanently lose their jobs. Major point made by plaintiffs was that there is an "implied covenant" arising out of the obligation the union takes when a man joins it whereby the union must exercise "care and judgment" in advising and counselling members in actions on behalf of the union.

An array of legal talent represented the union, including state representatives who are lawyers; union lawyers; and retained firms from Dallas and elsewhere. On the other hand, no other union members or any company offered assistance to the men who filed suit against the union.

Hailing the decision in favor of his clients, Albert Smith of Lubbock, leading counsel for the plaintiffs, told *CHEMICAL WEEK*. "We hope and believe that this case will be one step toward establishment of a Magna Charta for working men and women all over the country. This case establishes on legal grounds that international labor unions are obligated to use reasonable care and judgment in advising members of their rights and duties to their employers when they



this tiny particle → can be ground into 12,812,904 pieces

The new SWECO Vibro-Energy Mill wet-grinds particles (as tough as iron oxide, shown above) from 60 mesh to one micron or smaller. Until now wet grinding below 10-20 microns has been inefficient, slow and costly. The new SWECO Mill grinds quickly, with narrowest particle size distribution, and practically no material contamination. This is accomplished by efficient conversion of energy to particle size reduction through high-frequency, three-dimensional vibration. An illustrated technical paper describes in detail the operation and profit potential of the SWECO Vibro-Energy Mill. If ultra-fine grinding is a problem in your industry, we will be pleased to send you a copy, without obligation, at your request. SOUTHWESTERN ENGINEERING COMPANY, Dept. 330, 4800 Santa Fe Ave., Los Angeles 58, California.



go out on strikes against them."

Footnote to the proceedings: this case was decided by a jury in a "union" county of Texas. Phillips took no active part in court case, remaining on the sidelines—in fact subpoenas were used to get company officials' testimony into court. The union is expected to appeal the ruling.

Stock Option Hassle

A running attack on stock option plans culminated in Senate hearings last week—but the attackers, headed by Sen. Albert Gore (D., Tenn.), made little headway. Gore, in criticizing the plans, argues for repeal of the '50 law that allows capital-gains treatment of optioned stock.

Gore says that gains realized are in fact compensation to the executives who benefit from them, and that this income should be taxed at regular personal income tax rates.

Some of the stanchest counterarguments came from Louis Ware, chairman of International Minerals & Chemicals Corp. He told the Senate Finance Committee that granting of stock options to key employees has played an important part in his company's growth in recent years. Ware said he joined the company as president in '39, when sales were running about \$10 million annually, and that sales this year should be about \$130 million, with profits of between \$7 and \$8 million.

"This stock option has contributed much to making my job increasingly effective and in helping me build the company," Ware said. "I could not have obtained skilled and experienced men I needed for growth if I could not have offered them stock option incentives."

Ware said that there are instances of stock option abuse—"as there are of all things." Some companies offer too high a percentage of shares on option; others extend the plans to executives "who are perhaps not qualified;" management can show "undue favoritism" in granting options. But, Ware said, abuses of this nature cannot be controlled with laws, and are matters of internal company policy.

The greatest benefit of options, he said, is that of providing incentive to employees. "A man looks upon options as an opportunity to make

money; to become a capitalist," he said. "They help put a man in the position of thinking as an owner or an entrepreneur."

Treasury officials have promised to take a stand on the controversial issue next year, when an Administration tax reform bill is to be sent to Congress. Although Gore and other critics want the law ended, other measures less strong may be tried. Treasury, for example, is also considering limitations that may counter stock option abuses.

LABOR

Settlements: The Ruberoid Co. plant in Mobile, Ala., and Local 119, United Cement, Lime and Gypsum Workers, have agreed on a new one-year contract that provides a 5¢/hour wage increase for nearly 300 employees.

- Cyanamid of Canada Ltd. (Niagara Falls, Ont.) and Local 536, United Electrical Workers, have a new two-year agreement calling for an immediate wage increase of 5¢/hour for production employees and laboratory technicians and 6¢/hour for craft employees. Effective Oct. 1, the employee welfare plan will be revised to provide broader life insurance, sickness, accident and hospital benefits. On July 8, '62, wage rates will go up an additional 5¢/hour.

- Federal Labor Union Local 18195 members have voted to accept a new contract with Consolidated Molded Products Co. (Scranton, Pa.). The settlement includes a 33¢/hour increase over a three-year period; 6¢ of the 11¢ annual increase will be reflected in wages and the other 5¢ will go into a management-financed pension fund established in the contract. A 22¢/hour package was previously proposed by the corporation.

- A new contract between Local 3081, United Steel Workers, and Union Carbide Metals Co. (Ashtabula, O.) calls for the same wage scale, provides for a wage reopeners next year, includes some changes in interpretation of provisions. Both company and union officials say pay rates at the Ashtabula plant are the highest in the ferroalloys industry.

- Olin Mathieson Co. (Niagara Falls, N.Y.) and Local 15-77 Oil, Chemical and Atomic Workers, have a new two-year contract providing full payment of medical and group

life insurance for 380 production workers. Clifford Myers, international representative of OCAW District 15, estimates the fringe benefits package is equal to a 6¢/hour wage hike. Wages are not affected by the new agreement, which does, however, provide for a wage reopeners next June.

- Nearly 175 production and maintenance employees of Lehigh Portland Cement Co.'s Buffalo, N.Y. plant will receive wage increases totaling 14¢/hour under a new two-year agreement between the company and United Cement, Lime and Gypsum Workers. Other provisions: employer payment of the entire cost of health and welfare insurance for employees and 80% of the cost for employee dependents; a union shop and union-label agreement.

- United Brotherhood of Pulp Sulphite and Paper Mill Workers at Penobscot Chemical Fibre Co. (Old Town, Me.) has agreed to extend the present contract with the firm for one year. The salary range is \$1.71-2.31/hour. But the agreement stipulates that should the price of pulp recover its \$15/ton drop of last year, the hourly rate will then be open to increases—it will go up 1¢ over a \$10/ton increase above the old base price. During the bargaining, management asked for a 5% wage cut to be accompanied by cuts in administrative salaries. The union asked for a 4% wage increase.

- A new three-year contract designed to "insure uninterrupted production of potassium permanganate," according to the company, has been negotiated between Carus Chemical Co., Inc. (La Salle, Ill.), and Local 79, International Chemical Workers Union. The new pact calls for a 10¢ package increase the first year, with further increases on a rising scale (rather than the more conventional descending scale) over the three-year period. Carus is also expanding its apprenticeship program to four years, coupling it with formal schooling under the new agreement.

- In a settlement arrived at before the Federal Mediation Service, United Rubber Workers Local 325 agreed to take a 10¢/hour wage cut at Huntington Rubber Mills (Portland, Ore.). The cut, out of the present \$2.585 average hourly pay, will be used to help finance the employee health and benefit plan.



NEW SLANTS ON HEAT PROCESSING FROM SELAS

Selas to build huge steam reforming furnaces for producing hydrogen

Reaching another milestone of progress in an expanding industry, Selas has been awarded a contract to supply huge, high pressure catalytic steam reforming furnaces, for the production of large volumes of hydrogen. The furnaces will be installed at Tidewater Oil Company's new multi-million dollar Isocracking plant at its Avon, California, refinery.

This new 20,000 barrel-per-day Isocracking plant for upgrading low-valued fuel oils to high octane gasoline, jet and diesel fuels, is being engineered and constructed for Tidewater by Bechtel Corporation.

Selas GRADIATION® furnaces are designed to convert refinery and natural gas feed into more than 50 million cubic feet per day of hydrogen. Hydrogen will be produced by reacting the gas with steam, over a catalyst, at closely controlled temperatures. The catalyst-containing tubes are heated with DURARIANT® burners, strategically located to achieve the maximum in heat uniformity and temperature control.

Integrated with the furnaces is waste-heat-recovery equipment which generates 124,000 pounds per hour of steam.

Installation of the catalytic steam reforming furnaces will bring to 18 the total number Selas has sold in the past three years for production of hydrogen and synthesis gas for oil refinery use and for the manufacture of ammonia, methanol and oxo-chemicals.

Technical details on the production of hydrogen and synthesis gas are contained in a paper "What's New In Steam Methane Reformers", which was published in April, 1961.

Copies of this paper are available. Write to Fluid Processing Division.



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Mississippi Lime Company
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**CALCIUM
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We start with a raw material of superior quality. Mississippi Lime Company's entire limestone deposits test 99% pure calcium carbonate... a natural purity and uniformity unequalled in such quantity anywhere.

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BY BARGE... BY RAIL... BY TRUCK**

MISSISSIPPI LIME COMPANY

ALTON, ILLINOIS



ADMINISTRATION

KEY CHANGES

Frank P. Kelly to vice-president, Taylor Fibre Co. (Norristown, Pa.).

Paul van der Stricht to executive vice-president, Warner-Lambert Pharmaceutical Co. (Morris Plains, N.J.).

Charles Pike to vice-president, Merck Sharp & Dohme (West Point, Pa.).

John T. Whately to secretary-treasurer; **H. Nelson Flanders, Jr.**, to controller, Amerace Corp. (New York).

John M. Tyson to vice-president, Simoniz Co. (Chicago).

V. D. Mattia, Jr., M.D., to vice-president, Hoffmann-La Roche Inc.

Joseph Liptak to controller, Corning Fibre Box Corp. (Corning, N.Y.).

Robert P. Barnett, Robert J. Reilly, Walter H. C. Rueggeberg and **W. Spencer Thompson** to vice-presidents; **Thomas J. Laffey, Jr.**, to secretary, Atlas Chemical Industries, Inc. (Wilmington, Del.).

George S. Wagner to vice-president, Cryogenics, Inc. (Stafford, Va.).

Charles S. Benjamin to president and treasurer; **A. W. Landon** to vice-president and assistant treasurer; **W. K. Strong** to secretary, Finger Lakes Chemical Co., Inc. (Etna, N.Y.).

Frank J. Ronan to vice-president, Nitrogen Products Division, W. R. Grace & Co. (New York).

Edward H. Sellmer to assistant vice-president and general sales manager, custom pharmaceutical maker Strong Cobb Arner, Inc. (Chicago); **Edward W. Tyrrell** to director, Strong Cobb Arner of Canada, Ltd. (Fort Erie, Can.).

Francis W. Theis to vice-president-international, Pittsburgh Plate Glass Co. (Pittsburgh); **Bjorn Halmstrom** to president, Pittsburgh Plate Glass International S.A., a subsidiary (Geneva, Switzerland); **John H. Henshaw**, vice-president-sales, of the international company will direct the San Juan, Puerto Rico, office.

John F. Quereau to the board of directors and member of the executive committee; **Alexander H. Reynolds, Jr.**, to vice-president; **Stephen Loidl, Jr.**, to treasurer and controller, Leeds & Northrup Co. (Philadelphia).

U.S.I. CHEMICAL NEWS

August

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

1961

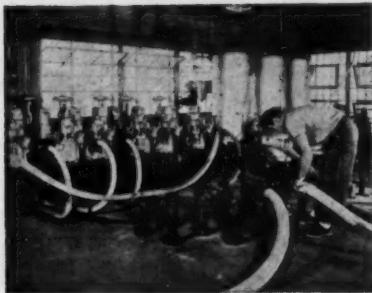
FDA OKs Polyethylene as Food Packaging Material

On June 10, 1961 the Food and Drug Administration published a regulation in the Federal Register, approving specification-grade polyethylene for food packaging. It is expected by U.S.I. and other polyethylene producers that this action will result in much broader acceptance of polyethylene in the food industry.

Polyethylene has, of course, been sold for food packaging for some time. However, many food processors have preferred to await formal FDA approval before making an investment in development and equipment. Now, U.S.I. feels, polyethyl-

MORE

Versatile Facilities Speed Mixed Shipments Of Alcohol and Solvents



Versatile denaturant mixing facilities assure rapid shipment of all government-approved denatured ethyl alcohol formulas from U.S.I. denaturing plants. Ethyl alcohol is available from U.S.I. facilities in mixed shipments with U.S.I. solvents such as butanol; acetone, n-butyl acetate, ethyl acetate.

New Journal to Report on Ch. E. Developments Abroad

The American Institute of Chemical Engineers plans to begin publication of the quarterly journal "International Chemical Engineering" in October of this year. It will be a selective journal of translations from Russia, Eastern Europe and Asia, covering current technology not reported by other authoritative Western sources.

Chemical engineers who are experts in the languages and industrial structures of the countries concerned will review what is published there. Their recommendations will be screened by leading Western authorities on specific areas of chemical engineering technology. Liaison will be maintained with government and private translation programs in the U.S. and Europe to avoid publishing duplicate data.

Bridgeport Brass Merges With National Distillers

Major Non-Ferrous Metals Company Becomes Operating Division In National's Diversification and Expansion Program

Bridgeport Brass, a major manufacturer of mill and fabricated products of non-ferrous metals, became an operating division of U.S.I.'s parent company, National Distillers and Chemical Corporation on June 30 of this year. In 1960, the combined sales of the two companies exceeded \$720,000,000, and combined assets were more than \$625,000,000.

The growing relationship between metals and polyolefin resins, in which U.S.I. holds a leading position, was a major factor motivating the merger, according to a joint statement by John E. Bierwirth, chairman, and Roy F. Coppedge, Jr., president of National, and Austin R. Zender, president of Bridgeport and now chairman of National Distillers' executive committee.

"There are many applications in which polyethylene, one of U.S.I.'s major products, and metals complement each other," the statement said. "Another area of interest is polyethylene-coated metals." The statement indicated that the merger will make possible the improvement and expansion of U.S.I.'s research effort toward the development of new products in these fields.

National Already in Metals

National already has a stake in the met-

als business through Reactive Metals, Inc., a 60% owned subsidiary which produces and fabricates special metals such as titanium and zirconium. This company has been managed by Bridgeport Brass since 1959. The merger assures Reactive Metals of Bridgeport's experience and technical competence in metals in the future and makes possible intensified sales efforts, the statement noted.

Mr. Zender will continue as president of the Bridgeport Brass Division, and becomes a member of National's board of directors.

National is the second largest distiller in the U.S. and a major producer of polyethylene resins, industrial chemicals, plastic film, fertilizer, fertilizer chemicals and metals. Bridgeport Brass is the country's fourth largest producer of brass, copper and bronze mill products. It is a growing factor in rolled, forged and extruded aluminum products and makes commercial and industrial fabricated products and special metals.



Left to right: John E. Bierwirth, chairman of National Distillers; Roy F. Coppedge, Jr., president of National Distillers; Austin R. Zender, chairman of National Distillers' executive committee.

August

1961

U.S.I. CHEMICAL NEWS

n-Butyl Alcohol Bulletin Released by U.S.I.



A revised and greatly expanded data bulletin on n-butyl alcohol, just released by U.S.I., contains U.S.I. specifications, physical properties, chemical references, resin solubilities, extensive list of binary and ternary azeotropes.

The 12-page bulletin is specifically designed for the surface coatings and chemical processing industries. Copies are available from Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., New York 16, N.Y.

Collapsible Polyethylene Jugs Designed for Chemicals, Other Liquids



Virtually all kinds of industrial liquids — from thin engraving fluids to viscous syrups, and from acids to milk — can now be transported and stored in a new five-gallon, collapsible polyethylene jug. The new lightweight, shatter-proof container is extrusion blow molded from U.S.I.'s PETROTHENE® polyethylene resin.

The jug is designed primarily for industrial liquids traditionally carried in five-gallon metal pails and 13-gallon glass carboys. The unassembled jugs take up about one-third the storage space needed for metal pails.

Have You a New Product To Tell the World About?

Make it routine to send your publicity releases on new products and developments to the Editor of U.S.I. Chemical News, often called the "Front Page of the Chemical Process Industries." You incur no charges or obligations by sending us your new product releases. The material will be judged and used solely on the basis of newsworthiness and space limitations.

National Center Proposed For Science Translations

A national science translation center, to keep American scientists abreast of progress reported in foreign languages, has been proposed to the American Chemical Society. A centralized clearing house will help solve the serious language barrier problem now faced by more than half of the nation's research personnel.

Besides handling translations from all sources, languages, and branches of technology and science, the center could sponsor research in translation matters, serve as an intermediary for new translation projects, and end the present duplication of effort by both individuals and specialized services.

CONTINUED

Polyethylene

ene's natural advantages in packaging will be put to much greater use for butter, cheese, cream and other dairy products, and for fresh and frozen meats.

U.S.I. packaging-grade resins are among those that comply with the FDA regulations. The company expects that these approved resins will be used increasingly in film; board, foil and cellophane laminations; molded cups; and vacuum-processed containers.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New spectrophotometric method for determining calcium traces in reactor grade sodium is described in bulletin now available. By precipitating calcium naphthalhydroxamate, then dissolving it, highly colored ions are released proportional to amount of calcium present. No. 1740

New type crystallizer, conispherical in shape, has been introduced. Maximum cross-sectional area at boiling surface said to improve crystallization process by providing large vapor release area, reducing entrainment in vapors. No. 1741

New air-drying solvent solution that substantially increases resistance of paper and paperboard products to water and weathering has been developed. Is mixture of silicone polymers and other film-forming ingredients. No. 1742

New low-cost, Teflon-lined neoprene rubber tubing designed to ensure safe flow of highly corrosive laboratory and industrial fluids at temperatures as high as 300°, now available. Sizes from 1/8 to 1/2 inch inside diameter. No. 1743

Hexachlorocyclopentadiene is subject of new bulletin covering typical reactions, reaction products with structural formulas, physical properties, toxicity, handling. Derivatives include pesticides, resins, intermediates. No. 1744

New polyethylene connector combines functions of stopcock and quick disconnect flexible tubing connector. Said to seal against 40 pounds of water pressure applied to male end. No. 1745

Trimethoxyboroxine is covered in new bulletin describing properties, handling, uses. Employed as fire extinguishant for metals such as Zr, Ti, Mg; curing agent for epoxies; nitrogen removal agent for refinery feed stocks. No. 1746

New polyethylene cap seal for metal drums said to seal directly on drum metal, not on flange or plug. Designed for safe, easy removal. Said to be tamperproof — give complete protection leakage, evaporation, substitution. No. 1747

Comprehensive reference booklet on aluminum sulfate (alum) is now available. Features many charts and tables on properties of solutions, calculations for various uses, analytical procedures. Includes AWWA standards and Federal specs for water and sewage treatment. No. 1748

Laminated plastics in sheet, tubing and rod form for mechanical and electrical applications are described in new brochure now available. Includes paper, canvas, linen, asbestos, glass and nylon base laminates. No. 1749

PRODUCTS OF U.S.I.

PETROTHENE® . . . Polyethylene Resins

MICROTHENE . . . Finely Divided Polyethylene Resin

Heavy Chemicals: Metallic Sodium, Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Sodium Peroxide.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Ethyl Alcohol: Pure and all denatured formulas; Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, DIATOL®, Ethyl Ether, Acetone, Ethyl Chloroformate, Ethylene, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate).

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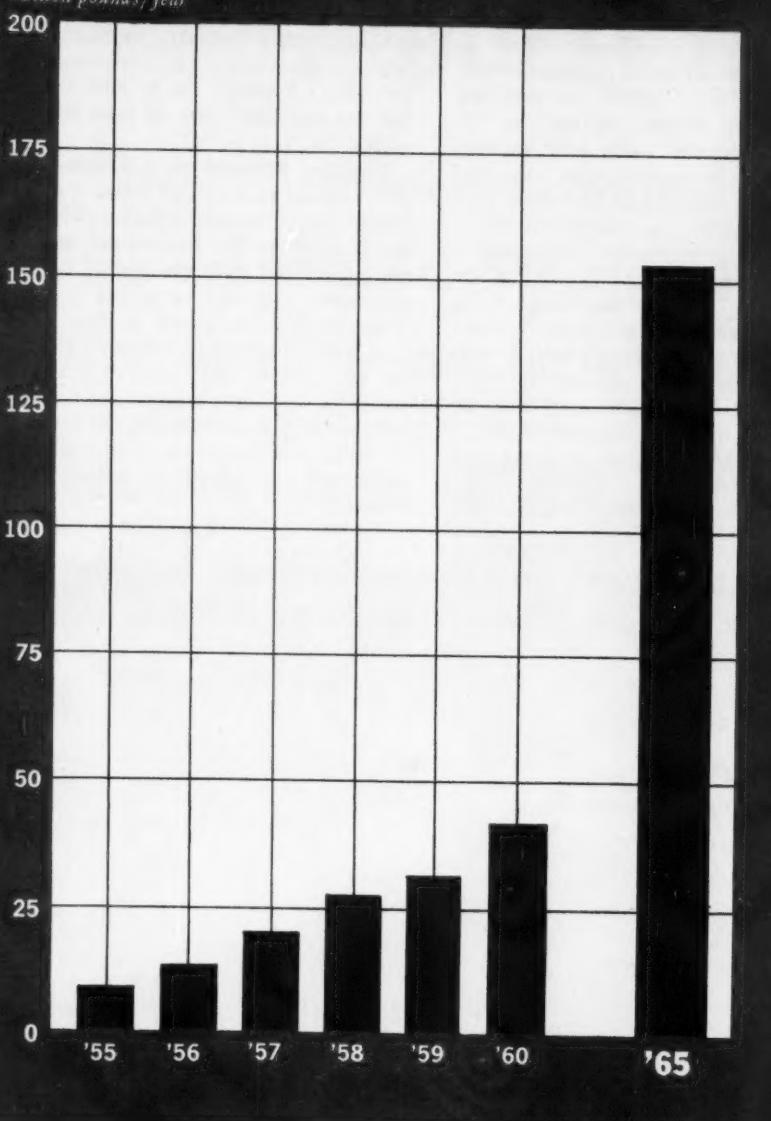
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MARKETS

A.B.S. Resin Demand: Primed for Climb

Million pounds/year



ABS Sings Siren Song

Monsanto will bring onstream within the next few months a new, 40-million-lbs./year ABS (acrylonitrile-butadiene-styrene) resins plant—the largest ever built—at Addyston, O. Meanwhile, as market prospects for the resins continue to brighten, trade reports indicate that several other companies are planning to join the ranks of producers. Behind the coming buildup is the expectation that demand for these polymers will take

a whopping jump in the next five years (*chart, above*).

During '60 demand rose to about 42 million lbs.—a five fold increase over '55's 9 million lbs. And as these materials carve themselves a healthy share of the refrigerator and automotive plastics markets, demand will likely soar to more than 150 million lbs./year by '65.

These optimistic estimates stem in some measure from the price history

ABS resins are bidding for big outlets in auto and refrigerator applications.

of the resins. Over the past five years prices declined 20%—from 65¢/lb. to today's 49¢/lb.; and this trend is expected to continue—perhaps to 40¢/lb., or lower, by '65—thus opening up some new markets to the compounds.

There's already evidence that prices may start dropping soon. Some of the indicators:

- Styrene and acrylonitrile prices have both tumbled this year, but these cuts have not been fully reflected in lower resin prices. Styrene (polymer grade) was cut from 14.5¢/lb. to 13¢/lb.; but more dramatic was the acrylonitrile price slash posted last month by American Cyanamid—from 23¢/lb. to 14.5¢/lb. (*CW Market Newsletter*, July 15). This reduction alone cuts ABS raw materials costs by 2¢/lb.

- Improved production techniques and output increases are unit costs, offering the possibility of price cuts.

- Producers are now tailoring ABS resins for specific applications. And these materials are being priced for realistic competition in their intended markets.

- The growing number of companies interested in producing these materials can precipitate price cuts. Established producers might reduce prices in an attempt to diminish the attractiveness of ABS resin production.

Room for More: Right now, though, the magnitude of the projected market leaves room for a certain amount of additional capacity—a relatively rare situation in the overbuilt plastics industry. Current capacity is estimated at 75 million lbs./year (*see table, p. 112*). When Monsanto comes onstream with its 40-million-lbs./year plant, capacity will jump to about 115 million lbs./year—but still about 35-40 million lbs./short of capacity required to match demand by '65.

Right now there are only four ABS producers: U.S. Rubber at Baton Rouge, La. (30 million lbs./year);

MARKETS

Borg-Warner at Washington, W.Va. (25 million lbs./year); B. F. Goodrich at Akron, O. (15 million lbs./year); Monsanto, with a semicommercial plant at Springfield, Mass. (5 million lbs./year).

But several other companies may join them. Among the companies reportedly looking at the market: Union Carbide, Dow, Foster-Grant, American Cyanamid and Celanese. When some of the major potential uses for ABS resins begin to materialize, the plant construction pace undoubtedly will quicken.

Where the Markets Are: Refrigerator and automotive applications now shape up as the big-volume potential for ABS compounds. Collectively these markets consumed only about 7 million lbs. of the resins in '60. But by '65 their total take will likely swell to at least 90 million lbs./year (see table, right). Refrigerator door liners alone represent a long-range potential of over 100 million lbs./year.

Although ABS resins display definite property advantages over high-impact polystyrene—the undisputed workhorse plastic for refrigerator uses—ABS resins' higher price has prevented them from winning a bigger share of this market.

However, as the price gap closes, and as acceptance grows for fluorocarbon-blown rigid urethanes for refrigerator insulation—a material that is incompatible with polystyrene but is compatible with ABS—the ABS resins will make important gains in the refrigerator industry.

Just now penetrating the automotive market, ABS resins face severe competition from many other plastic materials. But by '65 auto makers' demand for ABS materials will probably have reached 50 million lbs./year. Among the specific auto applications for ABS: seat backs, arm rests, instrument clusters, hub caps.

In '60 a variety of other end-uses for ABS resins accounted for the lion's share of the market. These applications took 35 million lbs., included telephone hand sets, luggage, shoe helps, plastic pipe, many others. By '65, these applications will add up to a not-inconsequential 63-million-lbs./year market.

The manufacture of telephones consumed about 4 million lbs. of ABS in '60 and this market may grow

to about 7 million lbs./year by '65—depending on the popularity of colored telephones. The black variety are made of cellulose propionate.

Pipe manufacture utilized about 15 million lbs. of ABS in '60, may take about 20 million lbs./year by '65. Although ABS resins have an edge over asbestos-cement pipe, they run into stiff competition from other plastic materials—e.g., polypropylene.

Luggage applications consumed 2 million lbs. of ABS in '60, but the potential here is enormous. While ABS compounds face keen competition from lower-priced materials such as polypropylene, demand for ABS in luggage manufacture will likely be at least 8 million lbs./year by '65.

Shoe heel producers' needs for ABS will register only a small gain in the next five years—from 6 million lbs.

in '60 to 8 million lbs./year by '65.

Miscellaneous applications represent a big potential for ABS. Radio cabinets, safety helmets, appliance housings, tote boxes, etc., consumed only about 8 million lbs. of ABS in '60, but will likely take at least 20 million lbs./year by '65.

Plenty of Potential: In sum, many of the end-uses for ABS resins are still virtually untapped. The prospects are excellent that the total market for the compounds will pass the 150-million-lbs./year mark by '65.

But much of his growth is dependent upon lower price schedules in the years ahead. And according to many, this is a likely prospect. At the same time, it is evident that the list of ABS resin producers will grow as the market growth outlook becomes brighter.

A.B.S. Resin Demand By End-Use

	Million pounds/year	'60	'65
Refrigerators	—	40	40
Automotive	7	50	50
Communications	4	7	7
Luggage	2	8	8
Shoe heels	6	8	8
Pipe	15	20	20
Miscellaneous	8	20	20
Totals	42		153

Source: CW estimates.

A.B.S. Resin Producers and Capacities

	Million pounds/year	
U.S. Rubber		
Naugatuck Chemical Division	Baton Rouge, La.	30
Borg-Warner		
Marbon Division	Washington, W.Va.	25
Monsanto Chemical		
Plastics Division	Springfield, Mass. Addyston, O.*	5 40
B.F. Goodrich		
Goodrich Chemical Division	Akron, O.	15
		Total 115

*Springfield plant will be closed when Addyston unit starts in third-quarter '61.

Source: CW estimates.

BULLETIN:

New Shell pocket computer helps calculate the evaporation rate of a hydrocarbon solvent in minutes—can be used right at your desk

Shell has invented a handy six-inch computer that lets you calculate solvent evaporation rates at your desk. It's called the Evapo-Rater.*

Here's how it can save you time and help avoid costly trial and error experimentation.

FOR THE first time you can determine solvent evaporation rates without leaving your office.

Shell's new Evapo-Rater does the work for you.

Supplements laboratory device

For years manufacturers have been familiar with the Shell Thin Film Evaporometer—used to determine evaporation rates.

But the Evaporometer resides in laboratories. It is expensive and time-consuming to operate. And it stands about 3 feet high.

So now Shell has invented the new six-inch Evapo-Rater, shown above.

Gives answer in minutes

The new Shell Evapo-Rater is based upon hydrocarbon evaporation rates determined by the Thin Film Evaporometer. It approximates results you can obtain with an Evaporometer, and gives you an answer in a matter of minutes.

The Shell Evapo-Rater makes selection of the correct hydrocarbon sol-



New Shell Evapo-Rater, above, determines solvent evaporation rates in minutes. Shell is offering the Evapo-Rater to help users select the correct hydrocarbon solvent.

vent quicker and easier than ever. It reduces the need for extensive trial and error experimentation.

For address of nearest Shell representative, write Shell Oil Co., 50 West 50th Street, New York, N.Y.

Works for blends of solvents

And it permits you to determine the evaporation rates for blends of hydrocarbon solvents as well. All this can save you valuable time and money.

A limited supply of Evapo-Raters is available for solvent consumers and can be obtained from your local Shell Oil representative. Call him today.



A BULLETIN FROM SHELL
—where 1997 scientists are working
to provide better products for industry

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Right on the Button!



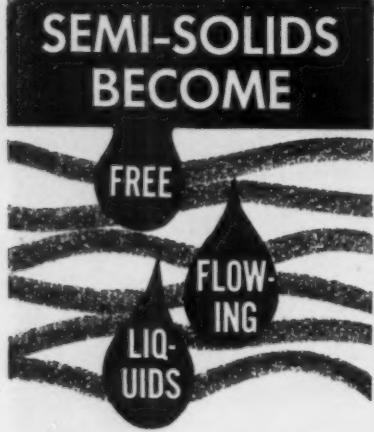
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MARKETS

Ion Propulsion Growing Appetite for Cesium

pounds (est.)

'65	1 million
'64	22,000
'63	4,000
'62	500
'60	30

Sources: '60, CW estimate; '62-'65 Dr. Ernst Stuhlinger, NASA.

Cesium in Space

The step-up in U.S. space exploration programs is brightening the outlook for cesium markets.

It's still too early to pinpoint demand over the near-term future for this space-age metal; only experimental quantities of cesium are now being used in ion engine propulsion. However, the National Aeronautics and Space Administration's Ernst Stuhlinger* optimistically estimates that cesium used in ion engines will total 1 million lbs./year by '65 (chart). Other market observers disagree, feel that 65,000 lbs./year is a more realistic estimate.

The market outlook hinges mainly on the progress of NASA's space exploration program. In '62, two ion engines are due for space tests, using a Scout booster to put them into orbit. Each engine will use about 20 lbs. of cesium. In '63, seven ion engines will be test flown on Scout vehicles; another will employ a Thor-Agena booster packing about 250 lbs. of cesium.

In '64, two additional space exploration rockets will be launched carrying Thor-Agena boosters.

If all goes according to schedule, the space exploration program will be in high gear by '65. A Centaur booster series is slated for testing; each engine requires about 1,000 lbs. of cesium. Also in '65 an attempt will be made to send a 60-kilowatt ion engine (requiring about 2,000 lbs. of cesium) around Mars and back.

In addition to the rocket booster market, several other cesium-using applications show promise. Example: thermionic converters — devices that

* Director of Research Projects Division at George C. Marshall Space Flight Center (Huntsville, Ala.).

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when you buy from Eastman

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Eastman
food-grade
antioxidants

Eastman manufactures the three basic antioxidants for edible fats and oils.

Tenox BHA
butylated hydroxyanisole

Tenox BHT
butylated hydroxytoluene

Tenox PG
propyl gallate

These antioxidants are supplied alone and in many different ratios and combinations to meet specific processing or service requirements, e.g., Tenox 2, Tenox 4, Tenox 6, Tenox R and Tenox S-1.

For more information on Tenox antioxidants and their use in fat- and oil-containing foods, send for catalog No. G-109, "Tenox, Eastman Food-Grade Antioxidants."

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What happens
when you buy from Eastman!

Case Tenox 2 arriving...

"It was late Friday afternoon, and I was anticipating the night game at Comiskey Park," related one of our Chicago representatives.

"I had completed my last call for the week, but on the way home stopped at a telephone booth to touch base with the office—to learn to my dismay that a good customer of ours out in Iowa had a sacrifice play working. Only, his sacrifice situation involved a kettleful of edible fat.

"As he had put it, 'The fat is in the fire.' Seems his rendering operation was well underway when he discov-

ered that he was out of Tenox 2 (one of our food-grade antioxidants that protects edible fat against developing off-odors and flavors). Unless he could obtain the antioxidant right away, the whole batch would very shortly enter the inedible category.

"Well, I knew that to get a common carrier into our local warehouse for a weekend pickup was out of the question. I had tried this before without success, but I headed for the office anyway to check all the possibilities.

"As I parked the car and absent-mindedly crossed the street, I had to

circle around a bus waiting for the light. That did it. I recrossed, got in the car, drove to our warehouse, picked up the Tenox, and headed for the Greyhound bus depot.

"My luck held, for they had a scheduled stop. After seeing this unusual fare off, I wired the customer: CASE TENOX 2 ARRIVING GREYHOUND TERMINAL 11 P.M. TONIGHT.

"A wire on my desk Monday morning made the effort very worth while. It read simply: THANKS."

An usual delivery? Yes, but a typical example of Eastman service.

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CHEMICAL WEEK's 2-part merchandising service
is the surest way to get your product story before
48,000 buying-powered management men . . .
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The November 18th "Chem Show Report"—
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and the industry-wide appeal of this unusual Show Issue.
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with the most compelling advertisement
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November 18th "Chem Show Report."
Closing October 28th.

*of your investment
at the Chem Show

MARKETS

convert heat into electricity. Dow Chemical, for instance, sees an ultimately enormous potential for cesium in thermionic converters.

Producers Lineup: At present five U.S. companies produce cesium, according to the U.S. Bureau of Mines: American Potash & Chemical Corp. (Trona, Calif.), Penn Rare Metals (Revere, Pa.), Fairmont Chemical Co. (Newark, N.J.), U.S. Industrial Chemicals Co. (Cincinnati), Dow Chemical (Midland, Mich.).

Because the current market for cesium is still well under 50 lbs./year, it's doubtful that all of these companies are actually producing the metal. However, it's certain they could swing into production as fast as demand picks up.

Doubtless there are sizable profits in cesium — it now sells for \$325/lb. (in 5-9-lb. lots). Big question: When will markets develop? The answer will become clearer as the progress of NASA's ion engine program unfolds over the next two years.

Plastics Buildup

Demand for plastics in construction continues to gain momentum. According to a newly completed study by Monsanto Chemical, plastics used in construction totaled 1.4 billion lbs. in '60, about 24% of the plastics industry's output.

An estimated 972 million lbs. of plastic materials went into construction applications, representing about 19% of total plastics production. In addition 428 million lbs. of alkyd resins, modified rosin, and coumarone-indene and petroleum polymers were used in flooring and paint, according to the company report.

Monsanto's study includes highway, utility, residential and nonresidential construction items such as structural panels, plywood and hardwood binding, wire coatings, high-pressure laminates, wall tiles and coverings, bath and plumbing fixtures, flooring, piping, lighting and paint.

The plastics used most heavily in construction applications are the vinyls — 305 million lbs. in '60, going into wire coating, wall covering, flooring, pipe and paint materials. But the phenolics were not too far behind—184 million lbs., used in plywood bonding, insulation, wiring devices and high-pressure laminates.

8 CASES IN POINT...



**Admex
plasticizers
help major vinyl
floor covering
producers
win satisfied
customers**

More and more producers of vinyl floor coverings are finding that Admex plasticizers help their products live up to customers' expectations . . . at the lowest possible cost. A decade of on-the-floor performance—in homes, offices, institutions and stores—proves that Admex plasticizers give vinyl flooring compounds superior heat and light stability . . . greater dimensional stability . . . excellent solvent, soapy-water, and grease resistance . . . faster production with fewer rejects.

Admex quality is high, its uniformity unequaled. Besides a strong basic raw materials position, ADM has pursued an aggressive plasticizer research program for over 10 years. Today ADM has 12 Admex products, conveniently warehoused throughout the country. That's why Admex is specified by all the leading floor covering manufacturers.

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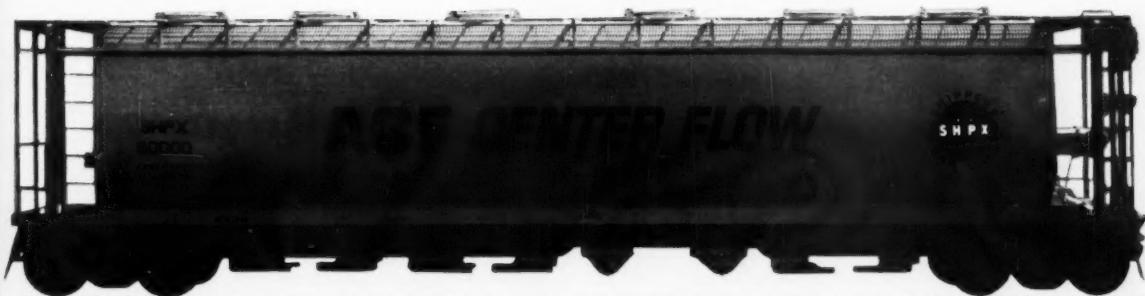
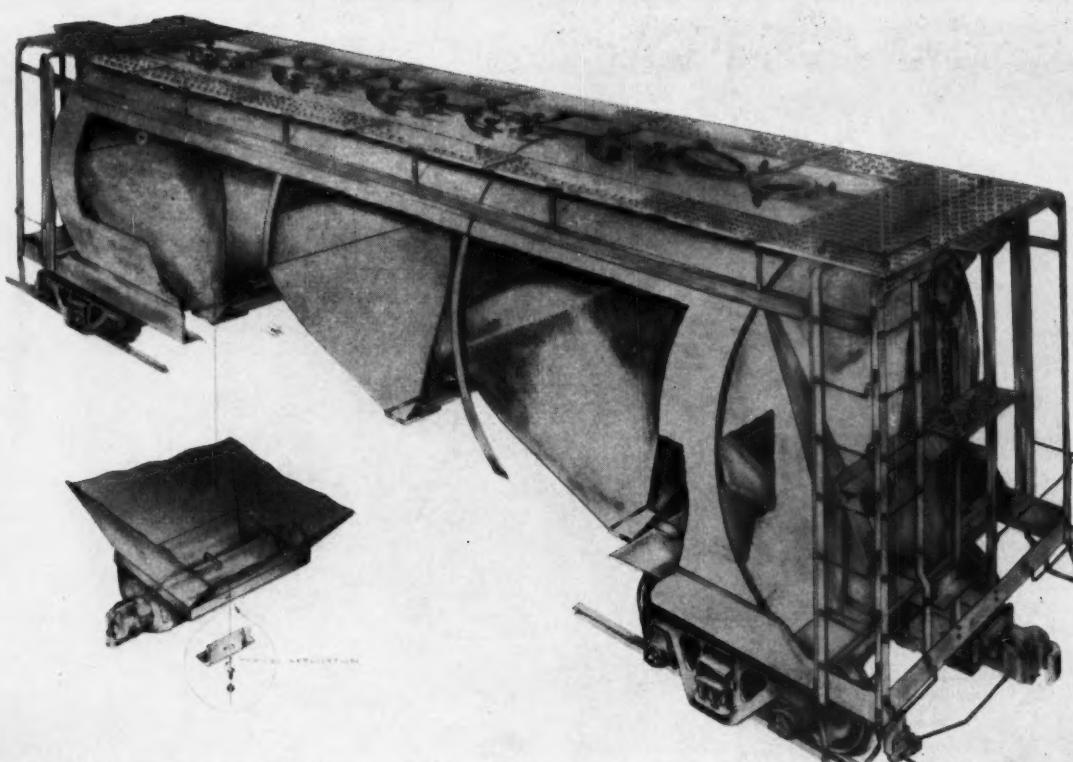
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Top center-line hatches serve the interior compartments of the car—allowing movement of different products in each compartment. Unloading is accomplished either by gravity or airveying from six outlets. The clean-bore design facilitates economy of lining.

Triple compartment covered-hopper ACF Center Flow cars are available as standard designs in 3500 and 4000 cubic foot capacity, equipped with 70 or 100 ton trucks. Designs of other capacities to meet special requirements are also available.

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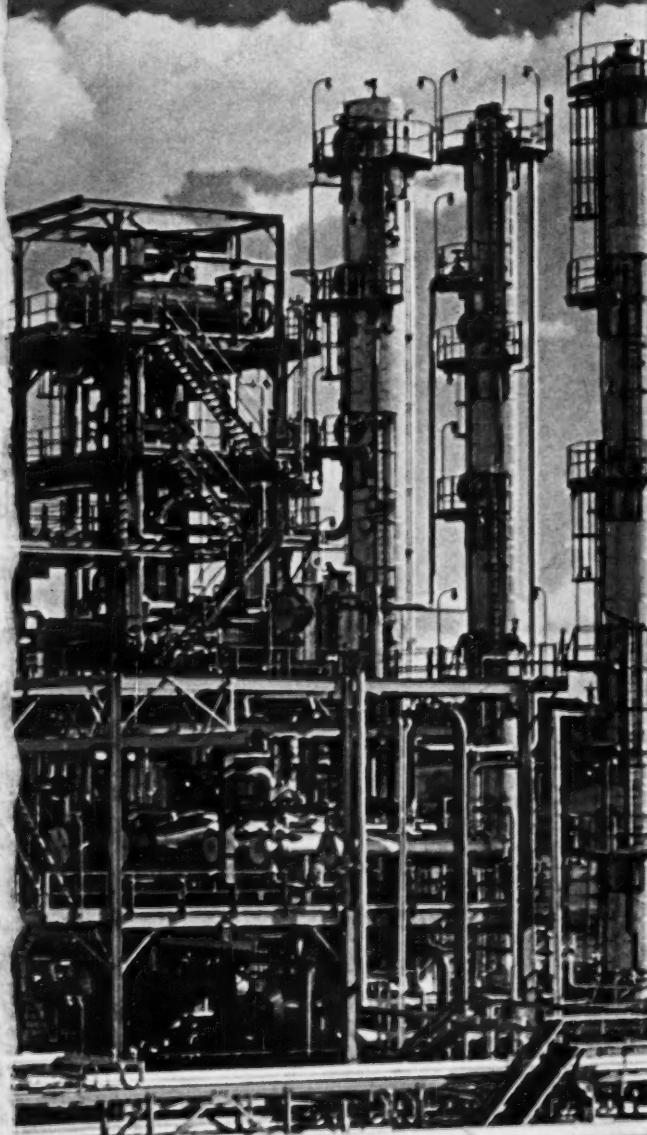
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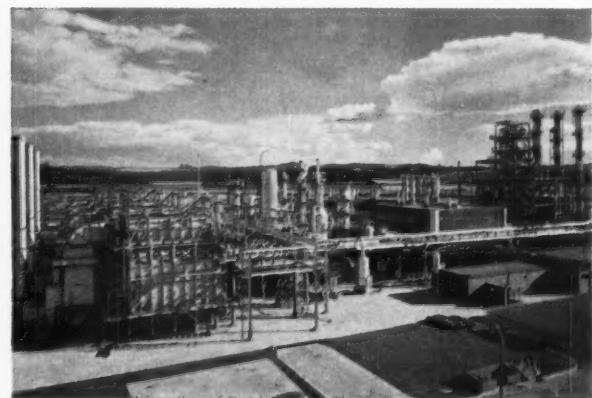


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FOR BRITISH HYDROCARBON CHEMICALS LIMITED . . .

Completed ahead of schedule in June, 1960, Number 3 Ethylene Plant for B. H. C. at Grangemouth, Scotland was designed and constructed by Stone & Webster Engineering Limited. The new plant is one of the largest ethylene units outside the United States.

The plant employs the Stone & Webster process reflecting cumulative experience gained over a period of years from the design of over 36 ethylene plants processing a wide variety of feed stocks. Maximum stream time, heat economy, simplicity of operation and minimum maintenance are basic to this process. We would welcome the opportunity to review how our skills and experience could prove profitable to your next engineering project.

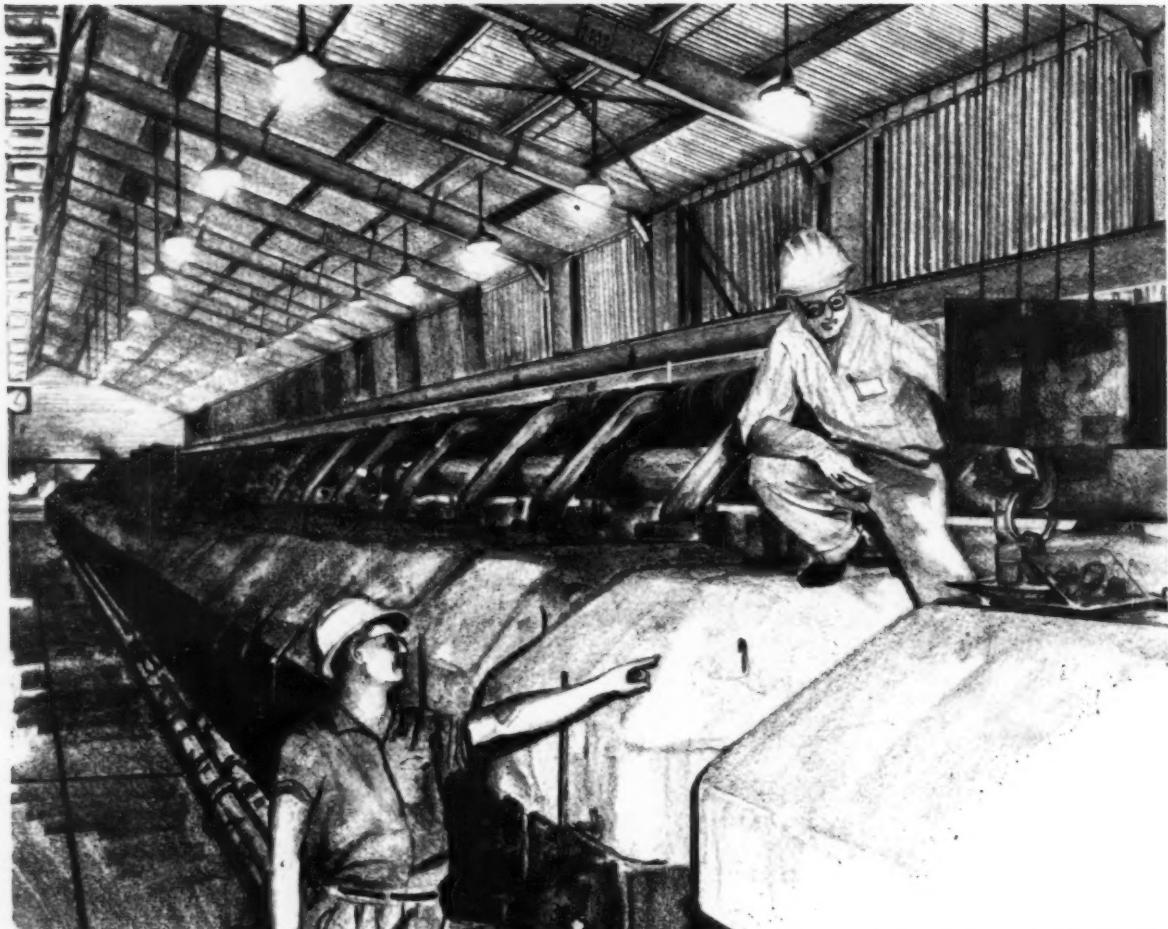


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Market Newsletter

CHEMICAL WEEK
August 5, 1961

Producers of synthetic glycerin are puzzled about motivations of soapers who last week cut prices of natural glycerin. Procter & Gamble initiated the move by offering a 1% discount allowance, bringing the customary $\frac{1}{4}$ ¢/lb. differential between natural and synthetic materials to $\frac{1}{2}$ ¢/lb. P&G reportedly does this by providing end-of-month rebates on sales; Lever has followed suit on size of cuts, but handles it somewhat differently, puts the deduction on the face of sales invoices.

Big question now: not whether synthetic glycerin producers will cut prices, but whether they will do so officially. Latest word from Shell—which has already initiated two price cuts on glycerin this year (*CW Market Newsletters, Jan. 7, May 6*): it will “keep the list price as is, but will remain competitive”—which, of course, means that it will be making price concessions.

Soapmakers say that additional price cuts depend on action of synthetic glycerin producers in meeting the first cut; the implication is that further reductions would not be entirely out of the question. The soapers could consider Shell's unofficial price cut justification for another reduction so as to maintain the larger differentials they seek.

The pressuring of glycerin prices stems from producers' continuing high stocks. According to the latest data from the Glycerine Producers' Assn., end-of-June stocks amounted to 64.4 million lbs. (29.8 million crude, 34.6 million refined); that's a 5.4 million lbs. decline from May '61 but still a whopping 17.5 million lbs. higher than at the end of June '60.

The continuing high inventories have contributed to a near 13% cut in production of crude glycerin—from 25.4 million lbs. in May to 22.2 million in June (including synthetic); output in June '60 was 24.9 million lbs.

The fertilizer industry is speculating about ammonium chloride's potential invasion of West Coast markets—mainly for use in fertilization of rice fields in California and Arizona. Crux of the talk: reports that Japanese producers are now negotiating for contracts to ship up to 100,000 tons/year of chloride to western U.S.

A 1 to 2¢/lb. price advantage over urea and ammonium sulfate favors ammonium chloride. But the chemical also has drawbacks (e.g., higher corrosive action on equipment), which raises some doubts about its chances of becoming very popular with farmers.

Ammonium chloride looks like a pretty good bet to some companies. There's trade talk, for example, that a newly incorporated company in Canada—Rocky Mountain Chemicals (Fort Saskatchewan, Alta.)—is trying to raise cash for a soda ash project that would provide ammonium

Market Newsletter

(Continued)

chloride as coproduct. Idea is to use a modified Solvay process (as the Japanese do) to make the products from ammonia and Alberta salt. The soda ash would probably be sold for use in metallurgical operations at Cominco's plant at Trail, B.C., and to a glass company in the Edmonton, Alta., area. Ammonium chloride would be marketed for fertilizer uses. Freight costs might be a handicap in handling the low-cost fertilizer—but there's apparently hope that the railways will be amenable to freight negotiations because the business would otherwise go to ocean carriers bringing ammonium chloride from Japan.

Semicarbazone is undergoing helicopter mass-spraying tests in Carbon County, Montana, as a possible antibiotic for control of comandra rust in lodgepole and ponderosa pines. The cycloheximide derivative was used at a concentration of $\frac{1}{4}$ oz./5-10 gal. of water-stove oil emulsion. Other comparison tests were made with emulsified No. 2 fuel diesel oil. Outcome of the tests won't be known until next summer. The tests are being run by the research division of the U.S. Forest Service in collaboration with Upjohn Co. One advantage of semicarbazone: it's considered harmless to humans, plants and wildlife.

More benzene is coming onstream in the face of a badly weakened price structure (*CW Market Newsletter*, July 29). El Paso Natural Gas Products Co. will bring in a 900-bbls./day benzene unit next month at its Odessa, Tex., refinery. However, most of the output will not hit the open market—it's slated for styrene production at the Odessa plant.

Meanwhile, Canada's benzene and solvent toluene capacity climbs. Texaco Canada Ltd. (Fort Credit, Ont.) has put its new, \$2-million petrochemical unit onstream. Initial throughput is 1,500 bbls./day. The first benzene shipment has already been made — to Polymer Corp. at Sarnia.

The plant design provides for future production of xylenes and ethylbenzene, as well as benzene and toluene.

The German plastics boom is softer. Output in the first five months of '61 amounted to 447,000 tons—11% more than in the same period last year. That's a substantial increase, but not comparable to the 25-30% growth rates racked up in previous years.

The slower growth rate is attributed to worldwide expansion of plastics capacity, which has led to extensive price cutting and increasing competition with producers of other countries.

Meanwhile, Austria gets a new polypropylene plant. A just-completed 5,000-metric tons/year plant at Schwechat will be operated by Danubia Petrochemie AG—a joint venture of Montecatini SPA and Oesterreichische Stickstoffwerke AG. Polypropylene will be marketed in Austria under the tradename Daplen; much of it will undoubtedly be exported.



Does Methyl Mercaptan set your imagination working?

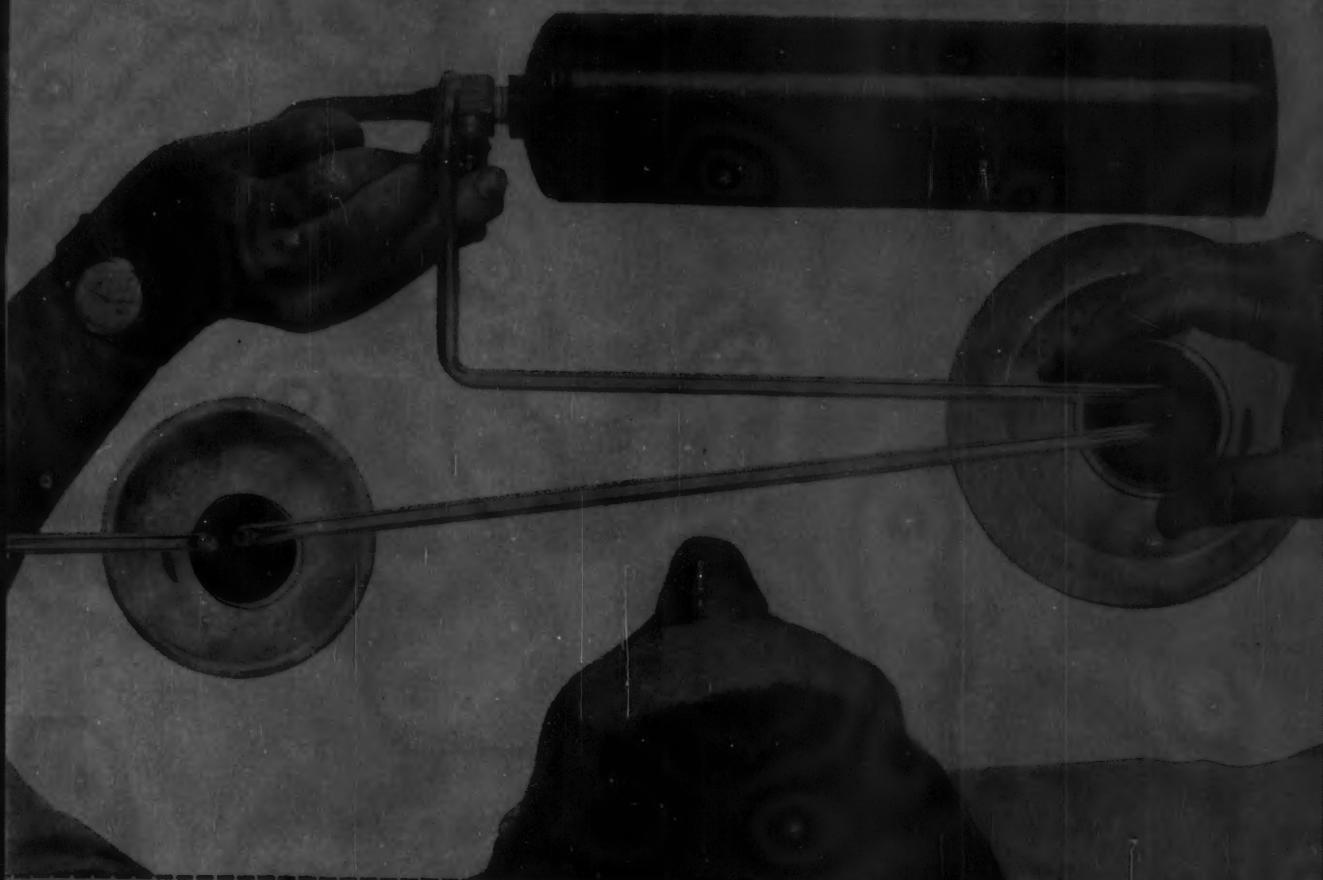
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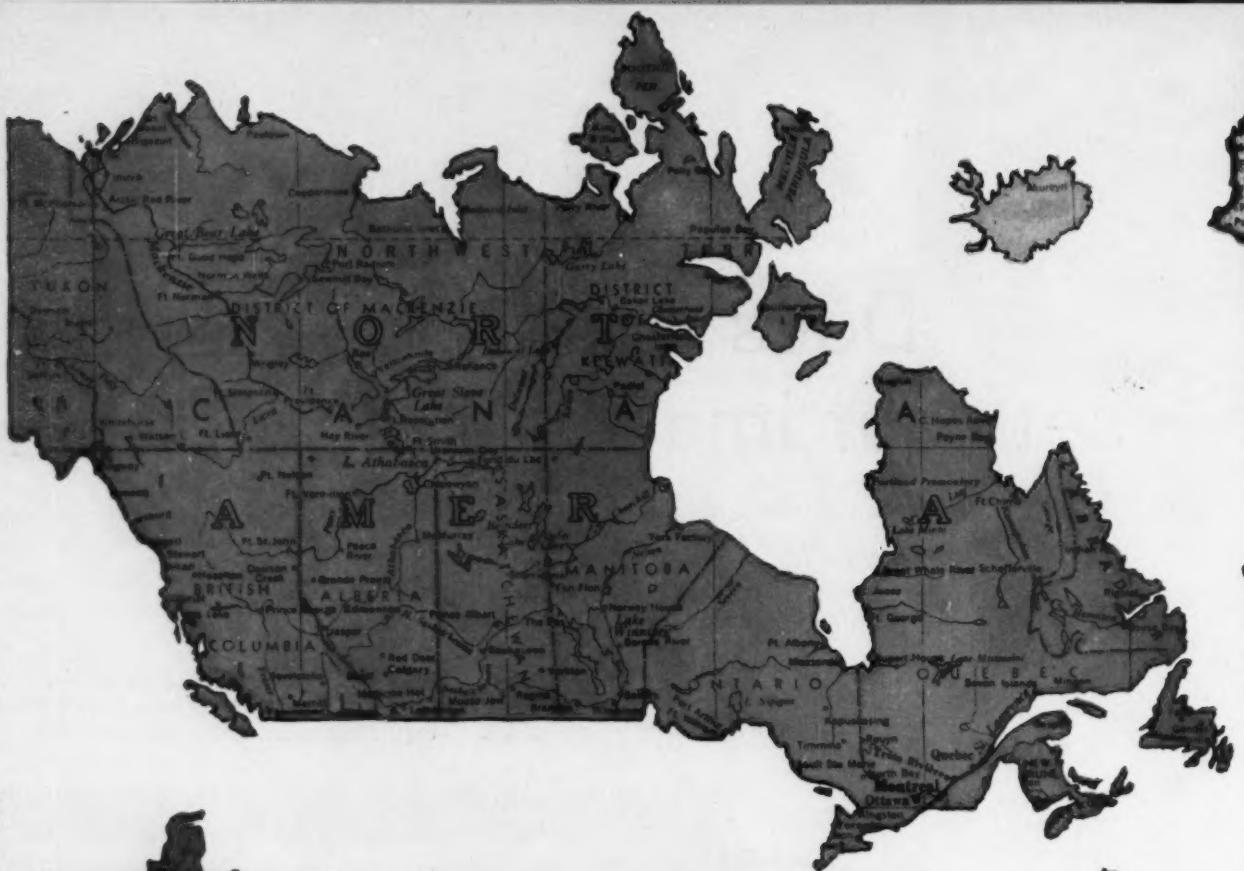
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Efficient process plant engineering requires a thorough familiarity with unit operations gained through a wide variety of chemical process design problems. The engineering experience accumulated by Chemico over almost half a century of service to major chemical, petroleum and petrochemical companies all over the world, forms part of the background which Chemico engineers have developed for undertaking the most complex and extensive projects from the "grass roots" stage through start-up and production.

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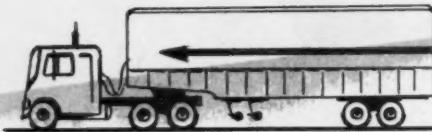
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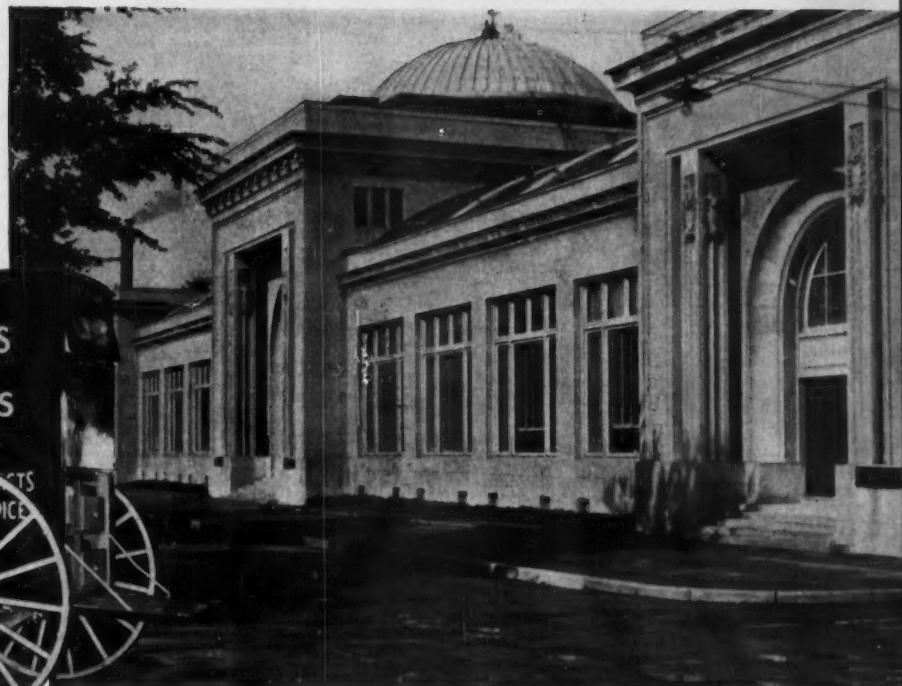
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SPECIALTIES

A leader in door-to-door selling for 94 years, Watkins Products is on a new growth kick.



Watkins symbols: medicine wagon, Winona office building.

Taking the Door-to-Door Way to New Sales

At Watkins Products, Inc. (Winona, Minn.), this week plans are far advanced for revamping packages for the company's increasingly important cosmetics line. The redesign, one of a series of projects begun almost two years ago, reflects Watkins' determination to bolster its position in the door-to-door selling field—a determination that has hiked sales from about \$45 million/year in '55 to its current \$60-65 million/year pace.

The brightly colored plastic spray bottles now under test are a far cry from the thick glass bottles the company used in packaging its first products 94 years ago. But other changes have become noticeable in the Watkins line in recent years—the product list now totals about 300, ranging from kitchen extracts and farm chemicals to medicines and cosmetics. The sales pattern has changed too—the percentage of sales to rural families has dropped markedly, so that now almost 50% of the customers are town dwellers. Sales are also increasing outside the U.S. where the firm is just beginning to build its strength.

Private Property: As indicated,

some of these changes have come in the last two years—dating from the company's change of name—to Watkins Products from J. R. Watkins Co. But two characteristics of the company—that of its being privately owned and rurally centered (Winona is about 100 miles southeast of Minneapolis)—are unchanged. And as such it has achieved the No. 8 spot (on basis of retail sales) among direct-selling companies. (Watkins pub-

lishes no annual reports; the sales volume and rankings are CHEMICAL WEEK estimates.)

Also, the company hasn't been able to change its image in the public mind—that of a company specializing in extracts and spices. Although it is said to be the world's largest seller of imitation vanilla, extracts of this kind now make up only 17% of the firm's total volume of business. Most of its other products are farm and

Watkins' King: New products and packages helped boost sales 30%.





Cut the fare all-the-way with St. Regis STRongtex® bags

Now you can give your chemicals full protection without being burdened with space-wasting, difficult-to-handle drums. St. Regis® STRongtex, a laminated textile bag, will protect your product and, at the same time, cut costs all the way through storage, handling, packaging and shipping.

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thus simplifying your materials handling. Finally, these bags will drastically reduce your shipping costs because of their convenient, space-saving size.

STRongtex is another example of St. Regis *Packaging-in-Depth*. This complete bag service assures you of the right bag, the right machinery to pack it, plus the services of skilled engineers. To meet your future needs, this program also includes continued research to develop improved packaging methods and economies.



PACKAGING-IN-DEPTH BY St. Regis BAG DIVISION
In Canada, contact St. Regis Consolidated Packaging Co., Ltd. **PAPER COMPANY**

SPECIALTIES

household specialties items. Among these (and the percentage they make up of company volume) are animal feed supplements, sanitation and pest-control products and insecticides for farm use (23%); cosmetics and toiletries (22%); vitamins and medicinal preparations (13% and 11%, respectively); and miscellaneous household aids—e.g., furniture polish, deodorant blocks, floor polishes, moth crystals, starch, spot remover (14%).

Farms Fading: The diversification and shifts in product importance have accompanied a greater emphasis on nonrural selling. Up until '21 the company confined its sales efforts to rural areas only. These were reached by individual salesmen (Watkins called them dealers); Watkins had no store sales or even branch offices. When the decision was made to go after the urban markets, distributing branches were set up—a kind of warehouse-office combination (there are now 136). These were used to recruit and to train dealers as well as to stock goods. In '26, the first distributor franchises were set up in cities and these have proved the most effective sales segment.

Some 517 franchised distributors, in 19 states, each with territory embracing about 200,000 people, are now listed. The goal is 1,800, says E. L. King, Jr., Watkins' president.

Watkins' 10,000 city dealers (about 10% more than last year) cover areas

What Watkins Sells

Products	Percent of Total
Farm items	23%
Cosmetics and toiletries	22%
Extracts, spices, summer drinks	17%
Vitamins	13%
Medicinal items	11%
Others	14%
(Aerosols constitute 10% of the over-all product line)	

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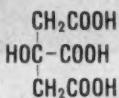
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A Versatile Industrial Organic Acid...



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TO SOLVE THE PROBLEM
Pfizer CHEMICAL
DIVISION
New York 17, N.Y.
SCIENCE FOR THE WORLD'S WELL-BEING



*More evidence of
progress in processing*

COWLES DISSOLVER mixes propellant for **POLARIS**

To meet the challenge of producing space-age fuels in big volume for missiles and rockets, including the great Polaris, Aerojet General Corp. engineers have recently completed a change from batch-type mixing to the first continuous process for propellants.

Under their direction Cowles dispersing specialists adapted a giant "COWLES DISSOLVER" to the highly critical operations involved, with noteworthy advantages.

1. *Big volume fuel production for large missiles and rockets became practical for first time.*
2. *Labor costs were cut 80%.*
3. *Fire and explosion hazards were greatly reduced.*
4. *Higher quality and greater uniformity in end products were attained.*

Cowles also used in first big high energy liquid fuel plant

Because the "COWLES DISSOLVER" provided the best pattern of dispersing materials and compounds to fine particle size in the

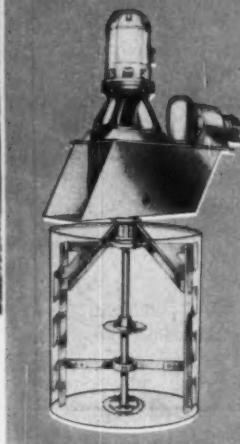
shortest possible time, six of the largest types were specially designed for the Callery Chemical Company plant. Close cooperation between Callery engineers and Cowles application specialists led from a two-stage operation to a single-step method combining the dispersion and reaction stages.

The same unique features of the Cowles that helped make these significant processing advancements possible offer you similar advantages. Cowles dissolving begins where conventional mixing stops, with the patented impeller and "the teeth that make the BIG difference." Ability of the exclusive M P D* (Maximum Power Delivery) drive to deliver over 90% of motor horsepower to the impeller even at slowest speeds enables the operator to have complete control of speed for best results under all conditions.

You get ultimate dispersion *faster—in less space—at less cost.*

LET US PROVE IT IN YOUR PLANT AT OUR RISK! Write today for more complete information.

SPECIALIZED APPLICATION SERVICE FOR CRITICAL DISPERSIONS



Specially
designed
Cowles impeller
and drive
assembly to
meet unusual
processing
problem.

Cowles experts have both depth and breadth of experience in critical, high-speed, high shear dispersions unequalled anywhere. Specially designed models for adaptations are available for all purposes—laboratory, pilot plant and full-scale production.

Your inquiry is invited. Perhaps the solution of a problem such as yours is already available from our records. If not, you can be assured of competent assistance in helping you get the right answer.

If your need is urgent or critical, contact the executive nearest you for special attention—

George E. Missbach, General Sales Manager
3330 Peachtree Road, N. E., Atlanta 5, Georgia
Telephone: CEdar 7-1691

H. N. Meyer, Jr., Vice President
Cowles Dissolver Company, Inc.
Cayuga, New York • Telephone: Albany 3-3214

Hugh F. Purcell, Applications Engineer
Morehouse-Cowles, Inc.
1150 San Fernando Road, Los Angeles 65, California
Telephone: CApital 5-1571



MOREHOUSE-COWLES, INC.
1150 San Fernando Road,
Los Angeles 65, California

434 *Trademark of the Cowles Dissolver Co., Inc., Cayuga, N.Y.

SPECIALTIES

averaging 4,000 population. And there are 2,569 salesmen-dealers (95% of whom are men) who service 800-1,000 customers each.

Watkins is now revamping rural operations, putting many country dealers under the city distributors.

An interesting facet of the sales setup is the use Watkins makes of student salesmen. About 400 college students now work for the company part-time. The company offers scholarships ranging from \$100 to \$600 to the 11 college students whose sales volume is highest.

Top-drawer Watkins dealers can do better than the \$6,000-12,000-income range the company says is readily achieved. Many such salesmen make closer to \$15,000-25,000/year.

In a field where dealer turnover is a major problem, Watkins claims to have one of the lowest rates of dropouts, prides itself on the number of families that have had several generations working for the company. Partly, this loyalty is due to the company's basic policies—house parties and direct mail, practiced by some direct sellers, are not used by Watkins (though both have been tried). The company feels that there's too much chance that guests at one man's house party will come from another man's territory; that direct mail from the home office might also invade someone's territory.

Community Relations: The company is also careful to keep the goodwill of the residents of the areas in which it manufactures, has several projects operating simultaneously. One is the sponsoring of special programs on local radio stations (with no interruptions for commercials).

It also supports local baseball teams and provides air transportation for basketball teams from local colleges (it uses the company's two private planes). Outside its program for local areas, Watkins provides schools with free samples and charts on spices and their uses and awards 24 scholarships to 4-H members.

The company claims to have one of the largest private printing plants in the U.S. Besides printing all its own cartons, labels, etc., it does much free printing for schools, churches, societies (such as the Cancer fund) as well as for soil conservation programs.

Dealers are encouraged to partici-

You'll Have Time to spare with Chemical Week ...



Are you toting home a bulging briefcase to stay abeam of news, trends and latest developments in your field? Do you find there just aren't enough hours in the day to catch up with all the news in the ever-expanding Chemical Process Industries?

If "Yes!"—More time with **CHEMICAL WEEK** can cut your reading to a minimum. Same thing for non-subscribers . . . and a personal copy will get the news to you faster. It'll save you valuable hours wading through paperwork, keep you apace of your job, well-informed on the whole field.

If you're a management man, why not put your order in right now? Only \$3.00 annually, \$5.00 for 3 years.

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An excellent sequesterant
... to inactivate troublesome
metallic ions...to chemically
dissolve deposits and also
stabilize them in the solution.

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Carbonizing, sludging, gumming MINIMIZED... with UCON Heat-Transfer Fluids and Lubricants

Save time, maintenance, and repairs by using UCON heat-transfer fluids. These synthetic fluids have all the desirable qualities of high-grade mineral oils—plus unusual properties of their own, which are utilized to maximum advantage as heat-transfer media.

UCON fluids do not carbonize or form sludges and gums under most conditions. They can actually permit use of a heat-transfer system under conditions where other fluids will not work. Electric immersion-heaters, calender rolls and other heat-transfer surfaces stay clean—give continuous, long-life operation at high efficiency.

In properly designed closed vented systems, UCON heat-transfer fluids have remained substantially unchanged after many months at temperatures as high as 500 degrees Fahrenheit.

Good viscosity-temperature properties make UCON fluids useful over a wide temperature range. For example, these fluids can be used in systems operated at moderately low temperatures as well as at 500 degrees Fahrenheit. Low, stable pour points, which do not involve depressants or waxes, meet the important need of

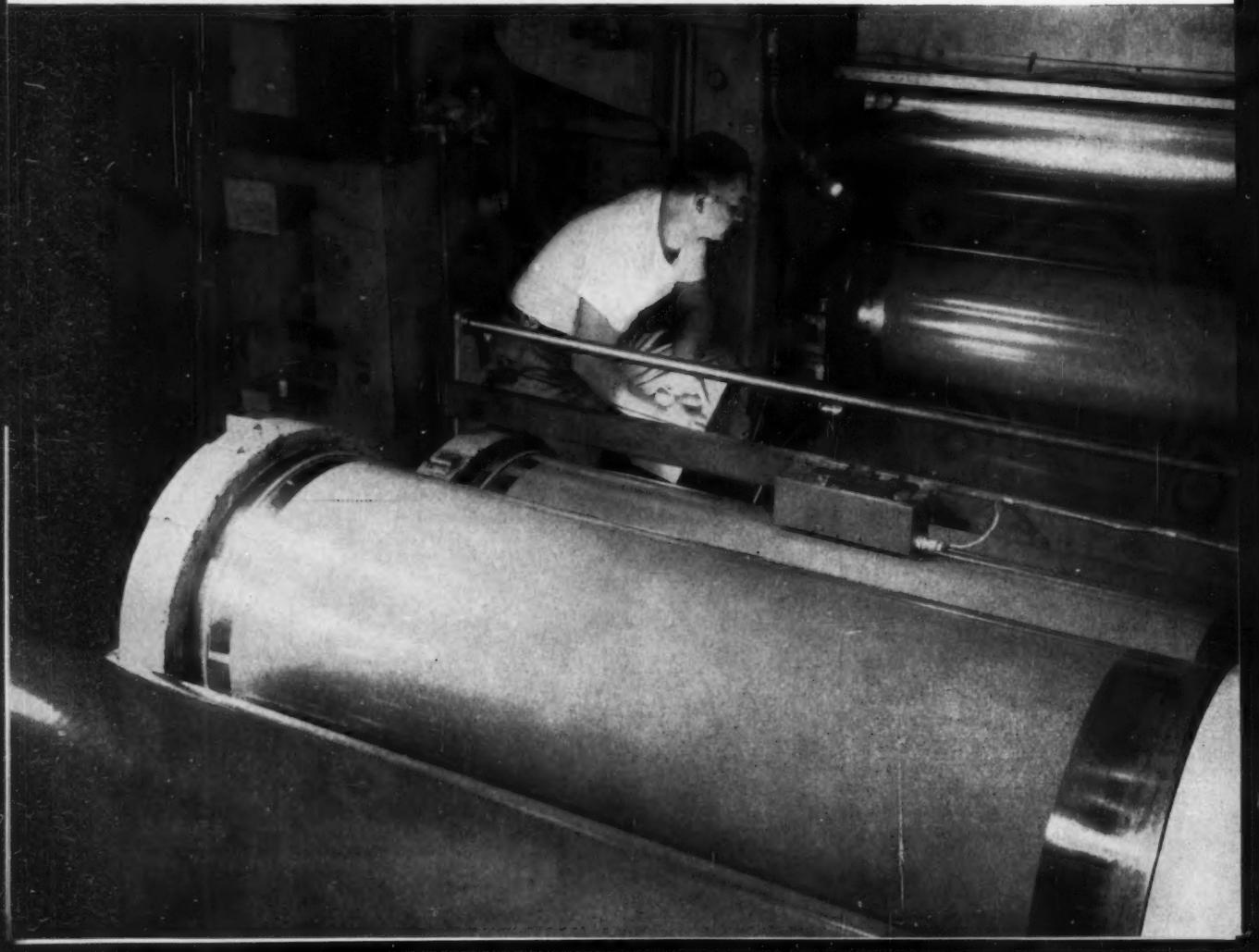
easy unit starting at low temperatures. Chemically-stable UCON lubricants are available as water-soluble or water-insoluble products. They exhibit excellent additive response, are non-corrosive under normal conditions, and have little or no effect on seal, packing, or gasket materials.

In addition to their outstanding performance as heat-transfer media, UCON synthetic fluids and lubricants have a wide range of applications in chemical processing, hydraulics, and industrial lubrication.

For complete information on how UCON fluids can meet your viscosity, solubility, and other property requirements, call your CARBIDE Technical Representative, or write: Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.



UCON and UNION CARBIDE are registered trade marks.



SPECIALTIES

pate in local chambers of commerce, church affairs, PTA events and other activities that will help maintain the "good neighbor" image the company wants.

Stepping Abroad: Watkins Products is becoming increasingly better known outside the U.S. The firm now has three distributing branches in Canada (and two manufacturing plants), plus operations in Australia, New Zealand and South Africa.

The first Canadian manufacturing branch was opened in Winnipeg in '15, and within the next few years another was opened in Montreal with a distribution branch in Vancouver. The Australian territory was first tapped in '35. By '46 other branches were set up in South Africa and New Zealand. The latter three branches are completely self-supporting, and while they are all completely Watkins owned, they operate as independent companies (all other manufacturing branches must clear major decisions through the home office).

Watkins had a plant in England before World War II but its operation there was bombed out and never rebuilt.

Additional territories overseas are being opened and others are being considered. Most activity is centered in Puerto Rico, Panama, Trinidad, Jamaica. And trial shipments are being sent currently to Japan and Lebanon.

A Minneapolis firm, International Traders and Counsellors, Inc., is retained by Watkins to investigate all who apply for an overseas distributorship or dealership.

What They Sell: Farm products are Watkins' biggest sellers, and the line consists of insecticides, worming agents, disinfectants, veterinary aids and feed supplements. Much of the work done on these products takes place at Watkins' research experimental farm outside Winona.

Cosmetics (under the Mary King label) are second to farm products in sales volume. Biggest sellers in this line are generally shampoos and hair care products, skin fresheners, hand lotions, bath oils and dusting powders.

Several new lines of fragrances are being introduced this year, including a novel aerosol mist cologne for men (under the King trademark). Other new items include a medicated lotion for teen-agers and a facial pack (or

What Do You Save With Chemical Week?

TIME—It's priceless to any chemical process management man. Here in CHEMICAL WEEK are compacted your reading requirements to save you endless hours of personal research and report reading. CW faces up to your specific job problems, helps you solve them—reports latest trends and developments, both technical and non-technical—covers all the worthwhile news about your industry. If you're not a subscriber, it's yours . . . at only \$3.00 for a full year's service, \$5.00 for 3 years.

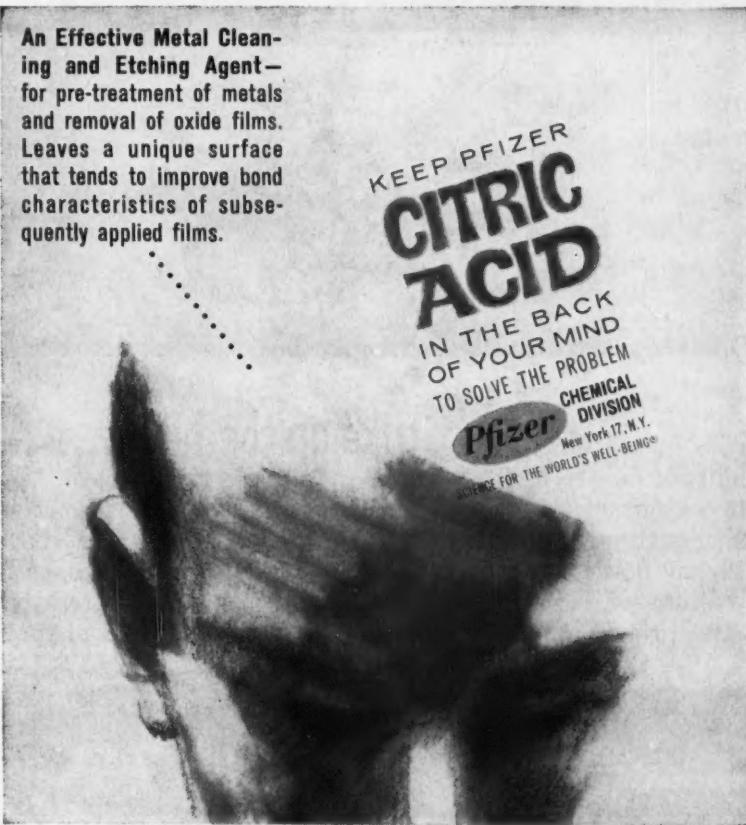
TALENT—Which way are you heading? Hunting for a new job for yourself? Looking for that right-hand man as your assistant? CHEMICAL WEEK's classified pages get thorough reading each week from both sides . . . the big bosses you'd like to have hire you . . . the promising young execs you want on your team. Try "Tracers" . . . they're fast, productive, economical!

MONEY—You'll save it because you can make more here with display advertising. Chemicals and raw materials, equipment, containers, technical services, supplies . . . just name your product! If the process industries use it, CHEMICAL WEEK readers buy it! Look at the advertisers in any issue . . . then put CW on your schedule!

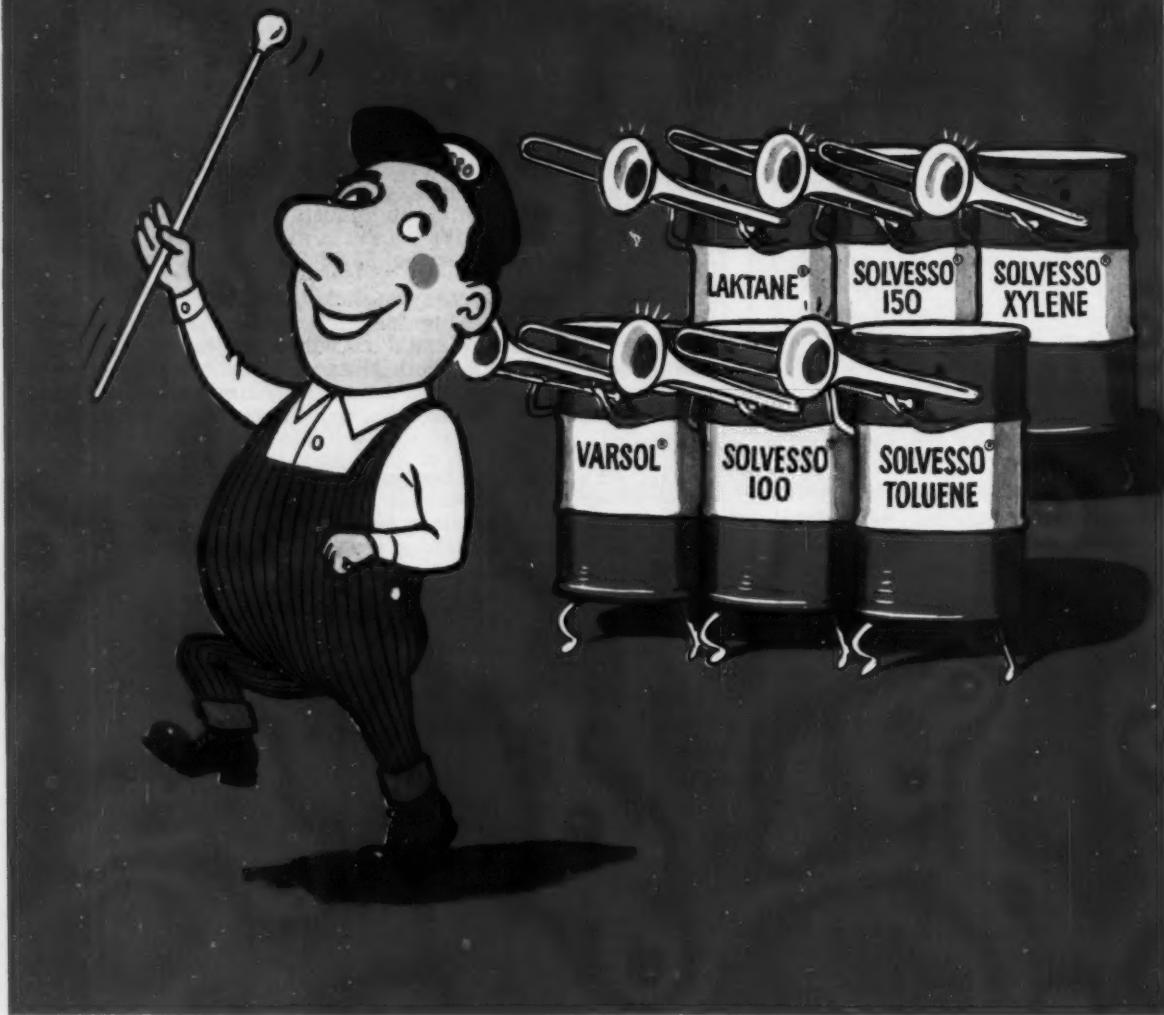


An Effective Metal Cleaning and Etching Agent—for pre-treatment of metals and removal of oxide films. Leaves a unique surface that tends to improve bond characteristics of subsequently applied films.

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A LEADER IN THE SOLVENTS FIELD!



"Strike up the band..." the versatility, uniformity, and dependability of Esso solvents have made them a leader in the field.

Applicable in chemical processing, and in the formulation of surface coatings and plastics, Esso solvents help assure you of uniformly high-quality end products. They are delivered fresh from conveniently located storage terminals. Technical assistance from Esso Sales Service Laboratories, backed by the world's leading research laboratories, is yours for the asking. Call your Esso Representative or write to us at 15 West 51st Street, New York 19, New York. (And tell 'em Nosey sent you!)

Nosey

HUMBLE OIL & REFINING COMPANY



SPECIALTIES

mask) that are being test marketed on the West Coast.

Also new is a home permanent with an instant neutralizer and fast-acting lotion.

Watkins has only one product devised specially for the Negro market — a pressing cream for straightening hair. A bleaching cream, however, is now being readied for the Negro market. The company's general feeling (and one that squares with recent market surveys) is that a completely separate cosmetics line isn't needed to attract Negro buyers. Most Negro women prefer conventional brands.

Healthy Sales: Vitamins, a big item for Watkins, are estimated to be bringing in about \$8 million/year in sales for the company. Watkins does not make the vitamins—they are made for Watkins by others. The vitamin line has been carried for about 12 years.

The company plans to market a chewable vitamin tablet that can be made in Winona (where all other Watkins tablet products are now made.) Also in the works is an uncoated decongestant cold tablet.

As is the case with most direct-selling houses, Watkins does little product pioneering. The company's new products are generally those that are already on the market. An exception is the aerosol spray cologne for men, which is thought to be a "first."

Big Operation: Watkins employs about 500 people at its Winona plant. There are 17 filling lines in the main plant, and four more for insecticides in the farm products building and lab. Included in the latter is a 40-cans/-minute aerosol filling line, which was installed about three years ago. Chief among products still purchased by the firm are lipsticks, home permanents and deodorant sticks.

Backing Its Dealers: To back its dealers, Watkins does considerable national advertising. The company now uses *Life*, *Look*, *McCalls*, *Saturday Evening Post* and *Good Housekeeping* magazines. When the company began its advertising program in '52 it played up the dealer. Since '55, however, the product has received greater emphasis. Some of the current ads mention only products.

Last year Watkins used national television as an ad medium for the first time, advertised on a once-weekly basis on the Dave Garroway "To-

NOW!

There's no
better time to
plan your advertising
and make
your reservation
for CW's November 18th
CHEMICAL SHOW REPORT.
Full facts available
from your
CHEMICAL WEEK
representative.
Call him today!

The chemical structure of

SPERM OIL is UNIQUE

Sperm Oil is a monohydric ester of fatty alcohols and fatty acids. It's truly a liquid wax, not a tri-glyceride.

Fatty alcohols in Sperm Oil are normal, primary, straight chain: C-14, C-16, C-18, C-20. They are insoluble in water, therefore Sperm Oil is quite difficult to split. Its free fatty acid is under 2%. And, Sperm Oil is very stable. It can be oxidized, polymerized, epoxidized, sulfurized, sulfated, chlorinated — and can be made self-emulsifiable!

Fatty alcohols are the key to Sperm Oil's advantages — they seldom occur naturally nor are they obtainable at low cost.

What a whale of a difference W-G-S sperm oil makes!

**WERNER G.
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An Easy-to-Handle Organic Acid—
dry, water-soluble and non-toxic.

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a bit of ARMOFLO here...



A pound, or less, of Armoflo® compound will condition a ton of various hard-to-handle dry materials.

Applied at an appropriate stage in processing, these liquid conditioners assure free flow of the product in process, function as anti-caking and anti-dusting agents during subsequent handling and storage.

Armoflo compounds may be applied as received, by spraying, dripping or fogging onto the product while it is tumbling in rolling or blending equipment. Armoflos coat each particle with a monomolecular layer that changes hygroscopic surfaces to hydrophobic. They will withstand product heats up to 325° F. and are stable in storage for long periods. Armoflo compounds also provide virtually complete corrosion inhibition for iron and steel processing equipment.

A smoother, faster, more even flow of product results when Armoflos reduce friction between particle surfaces. This lubricating action reduces abrasion and thus reduces "fines" and dust formation.

Armoflos are now being used commercially with a number of products and current testing indicates many more potential applications. The versatility of Armoflo compounds is demonstrated by the following three categories of materials.

FERTILIZERS

Armoflo compounds are effective conditioners for all types of mixed fertilizers—low as well as high analysis grades. The compounds act as anti-dusters on low analysis grades and as anti-dusters and/or anti-cakers in high analysis grades. Armoflos are being used effectively as anti-dusting and anti-caking agents on these typical grades:

Anti-caking and Anti-dusting of High Analysis Grades	Anti-dusting of Low Analysis Grades
0-20-20	0-20-0
5-10-5	3-12-12
5-20-20	3-9-18
7-21-21	3-9-27
7-28-14	4-12-8
10-10-10	4-12-12
12-12-12	5-40-0
15-15-15	8-8-8
17-7-0	10-6-4

Armour Industrial Chemical Company

One of the Armour Chemical Industries • 110 North Wacker Drive, Chicago 6, Illinois

DOES A BIG JOB HERE

SINGLE FERTILIZER SALTS

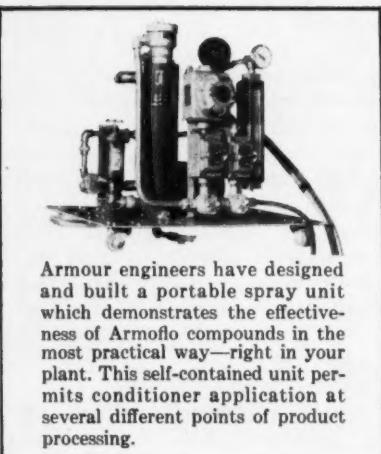
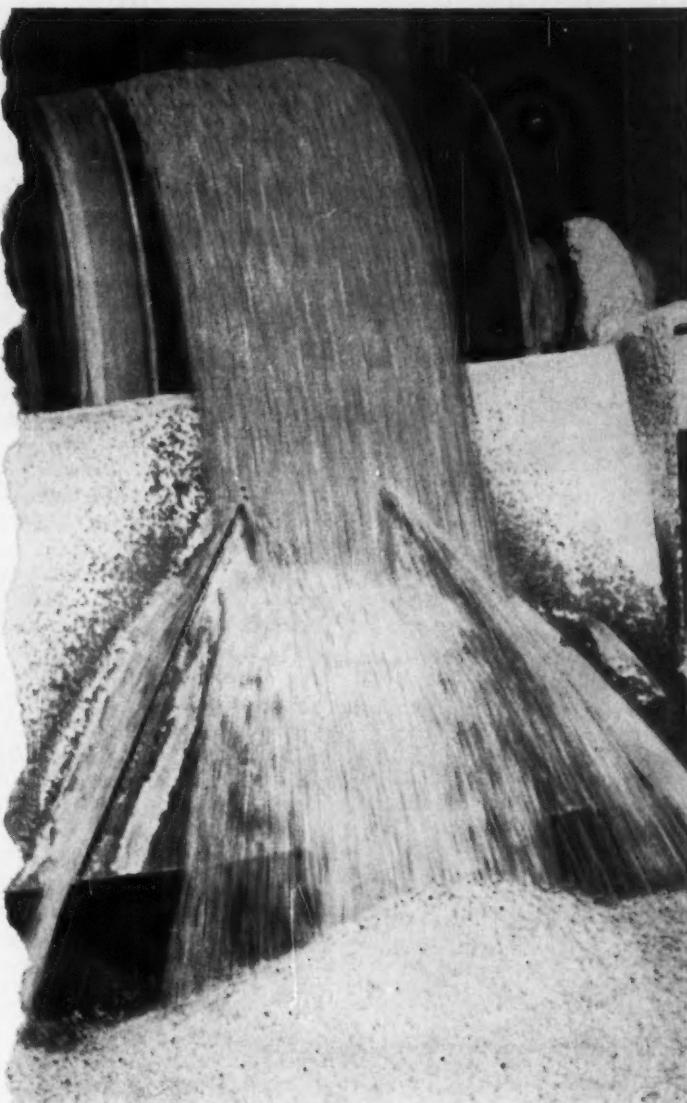
Many of the salts used in formulating mixed fertilizers are hygroscopic and must be conditioned to prevent caking. Armoflo compounds successfully inhibit caking, improve product flow and reduce dust resulting from abrasion. Typical of such Armoflo applications are:

Ammonium chloride	Nitrate of lime
Ammonium sulfate	Potassium chloride
Diammonium phosphate (21-53-0 and 16-48-0)	Potassium nitrate
Manure salts	Potassium sulfate
Monoammonium phosphate	Sodium nitrate
	Urea (prill & crystal)

OTHER MATERIALS

Armoflo compounds likewise do an effective job of helping prevent caking and dusting of various inorganic and organic materials. They function well across a wide pH range from acidic to highly alkaline. The materials listed below, as well as similar products, can be successfully conditioned.

Caustic Soda	Pentachlorophenol
Detergents	Rock salt
Dextrin-urea blends	Sodium bisulfate
Fluorspar	Sodium chlorate
Glues (mixed, powdered)	Sodium metasilicate
Guar gums	Sulfur
Hypochlorites	Sylvite
Insecticides	Thermosetting plastics
Magnesium oxide	Zinc chloride
Metallic soaps	



Armour engineers have designed and built a portable spray unit which demonstrates the effectiveness of Armoflo compounds in the most practical way—right in your plant. This self-contained unit permits conditioner application at several different points of product processing.



Armour Industrial Chemical Company
110 N. Wacker Drive • Chicago 6, Ill.

Please send me:

a copy of your new, revised edition of "ARMOFLO—Armour Anti-dusting and Anti-caking Chemicals."

a sample for conditioning.....
(Name of your product)

Name.....Title.....

Company.....

City.....Zone.....State.....

IMPROVE

LEVELING and
U.V. LIGHT
RESISTANCE
of lacquers



GLOSS
of floor waxes



SCUFF
RESISTANCE
of panned candy



ADHESION
of inks



LEATHER
FINISHING



SOLUBILITY
CONTROL
*of enteric
coatings*

WITH MANTROSE
SPECIALTY
SHELLACS

Mantrose, now the nation's largest shellac research and production center, has been making the finest bleached shellac available for more than 40 years. You can't buy a standard natural shellac of better quality.

But, have you considered using an "individualized" shellac . . . tailored to improve the performance characteristics of your product? Leading shellac users call on skilled Mantrose researchers to build brand new advantages and predictable processing characteristics into the natural product. Why not try a shellac that meets your exact specifications? Just call or write for a consultation.

The Mantrose Corporation

99 Park Ave., New York 16, N. Y. • Phone MU 7-2762
Plant address: Attleboro, Mass. • Est. 1919

SPECIALTIES

day" show. The results of the 13-week schedule were not overwhelmingly successful in the eyes of some of the Watkins' executives, many of whom feel that advertising in magazines is a better way to convey the proper image of the company and its products.

Start with Liniment: The company got its start in 1868 when 28-year-old Joseph R. Watkins began selling bottles of liniment from a horse-drawn wagon in Cincinnati.

For 17 years Watkins used his kitchen as a factory, mixed and bottled his products by hand. His sales radius was little more than 100 miles until 1885, when he moved to Winona.

At Winona, Watkins expanded his line to include an "Egyptian stick salve," a vegetable cathartic pill and Petro-Carbo Salve—the latter is still an active seller. By this time Watkins had hired several salesmen, and in the mid-'90s the first Watkins branch house was set up, in California. A manufacturing plant eventually was built in Oakland, which was operated until recently. Watkins now feels that products can be shipped from Winona at less cost.

Additional distribution branches were set up in Memphis in 1910 and Baltimore in '12 (the Baltimore operation was later moved to Newark). Later, manufacturing units were set up at both points. Operations in Newark—mostly soapmaking—were closed when synthetic detergents took over much of the cleaning product field. Memphis remains the firm's second-largest manufacturing base in the U.S.

During the early 1900s the firm expanded its Winona facilities, and to accommodate the additional personnel, a lavish administration building (*see picture*), with vaulted ceilings, stained glass windows and mosaic inlaid walls, was erected.

Run Harder: Today considerable reorganization is going on at the Watkins home office. Departments are being consolidated, others decentralized, and remodeling is contemplated for the home office building at Winona to make better use of space.

With its revamped product lines, new products and revisions in organization, the 94-year-old company is now in a much stronger position in the direct-selling field.

Poison Primer

Chemical Specialities Manufacturers Assn. (50 East 41st St., New York, N.Y.) has issued a new edition of the "Compilation of Economic Poisons (Pesticides) Laws."

The book, produced in looseleaf form, contains in one volume the federal and state laws and regulations of special interest to manufacturers, packagers and sellers of insecticides, fungicides, rodenticides, disinfectants, sanitizers and related products. It also contains the model law, summary tables, related laws directly applicable to economic poisons and pesticides, enforcement officials listings (with addresses).

The book sells for \$48/copy in the U.S. (which includes cost for additions when printed) and \$49 in other countries.

EXPANSION

National Move: Naugatuck Chemical Division, United States Rubber Co., has appointed The Dorsey Corp. (New York) as national distributor for Naugatite, its architectural coating for masonry surfaces. A newly established subsidiary, Dorsey Products Corp. will handle sales of the polyester-based liquid. A national network of franchised dealers will be set up by Dorsey to sell and to apply the material.

More Adhesive Acreage: A new plant is being built in Franklin, Ky., by Kendall Co. to house new adhesives production facilities. The company, which moved to Franklin from Chicago in '56, markets industrial tapes under the tradename Polyken, sells surgical tapes, adhesives bandages and plasters under the Curity name. The completed structure will give the firm about seven acres of plant under one roof.

Adding Perfumes: Max Factor & Co. (Hollywood, Calif.) has acquired all the outstanding capital stock of Parfumerie Internationale Corday (Paris), Parfums Corday, Inc. (New York), and subsidiary corporations. Corday, which markets Toujours Moi, Fame, Trapeze and Jet perfumes, will become a wholly owned subsidiary of Factor; present management will be retained.

PLASTICS DIVISION CHEMICALS

TEAR OFF AND FILE

NEW DIRECTIONS FOR THE CHEMICAL INDUSTRY

Coal-tar derivatives that lead the way to new, or improved, products... and profits. This folder includes coal-tar chemicals and petrochemicals... some are commercially new, others long established. All are unsurpassed for purity, uniformity and quality. Look them over carefully. They can help you discover new and economical solutions to a variety of production problems.

Allied
Chemical

PLASTICS DIVISION CHEMICALS



PHENOL USP (SYNTHETIC) Only Plastics Division can supply you with every grade of Phenol... both synthetic and natural. Our synthetic Phenol... made to very exacting specifications... is right for all applications. In fact, it is one of the few Phenols pure enough for use in the production of Nylon 6! And when you order Plastics Division Phenol, you get more than a top-quality product. You get the absolute assurance of a regular supply... one that will satisfy your requirements throughout the years. Next day delivery in the East and Midwest can be depended on, too, for we now have storage facilities in Toledo, Ohio, as well as at our Philadelphia plant. Look to the natural Phenols to save you money—particularly in resins, lube oil extraction, and alkyd phenols. A highly versatile chemical, Phenol, is valuable in the manufacture of nylon and epoxy resins, medicinals, dyes, photographic developers, plasticizers, wood preservatives, weed killers, insecticides, and anti-oxidants.



TAR ACIDS Our standardization methods insure regular shipments of the highest quality tar acids. We not only can give you the blend you need, but will be happy to help you solve any tar acid problems.

Phenols	Cresylic Acids
Synthetic & Natural	Specially blended mixtures of close-cut fractions
Technical Phenol (all grades)	Special Engine Cleaning Grades
Phenol-Cresol Mixes	Xylenols
Phenol-Cresylic Mixes	Metaxylenol—45°C., 56°C., Min. M.P.
Cresols	Crude and Refined Grades
Cresol, USP	Special Fractions
Ortho Cresol (from 50% to 98+ % purity)	blended to order
Meta/Para Cresol	
Resin Cresols	
Special Cresol Fractions	



A-C® POLYETHYLENE Combine usual characteristics—high melting melt viscosity, resistance to water and chemicals (at room temperature), compatibility with waxes and wax-like materials, and you get A-C Polyethylene, the coating exactly right for so many varied applications. For paperboard coatings: improves gloss retention, adds resistance to water and abrasion and to chemicals, increases strength, frequently cuts down consumption, can be run on conventional equipment. For fabrics: treatment with A-C Polyethylene emulsion improves strength, abrasion resistance, crease and resistance to needle cutting. For leather: can be used in polishes, candles, elastics, rubbers, and in many different applications. And new uses continue to be discovered every day. Looking for a chemically inert coating? One that is both tasteless and odorless in the presence of organic liquids? Ethylene may solve your problems. Any time for technical assistance.

ELASTEX® PLASTICIZERS Each of Allied Chemical's plasticizers has special properties that can improve a variety of products. "Elastex" 90-P Plasticizer is a good example. It offers electrical insulation performance substantially equivalent to that of high quality DOP, plus superior retention of elongation after severe heat-aging. It is recommended for use in vinyl compounds for high temperature wire insulation. Why not look into the whole family of Elastex Plasticizers? Most likely one or another of them can improve the product you manufacture.

Dibutyl Phthalate*
Dimethyl Phthalate*
DCHP Plasticizer — Dicyclohexyl Phthalate
10-P Plasticizer — (Diisooctyl Phthalate) (DIOP)
28-P Plasticizer* — Di-2-Ethylhexyl Phthalate (DOP)
18-P Plasticizer* — Isooctyl Isodecyl Phthalate
20-A Plasticizer* — Diisodecyl Adipate
40-P Plasticizer* — Butyl Isodecyl Phthalate
48-P Plasticizer* — Butyl Octyl Phthalate
50-P Plasticizer* — Butyl Cyclohexyl Phthalate
60-A Plasticizer* — Di-2-Ethylhexyl Adipate
82-A Plasticizer — Normal Octyl—Normal Decyl Adipate
82-P Plasticizer* — Normal Octyl—Normal Decyl Phthalate
90-P Plasticizer* — Diisodecyl Phthalate
36-R Plasticizer — Medium molecular weight polymeric plasticizer
Plasticizer 136* — An aryl Alkyl hydrocarbon

*Available in Tank Cars or Trucks

ACETONE when used in cellulose acetate and epoxy resins, acetone must be especially free from contaminants. That's why Plastics Division's super-pure acetone is preferred for these applications—and for use as a solvent, in many chemical extractions and syntheses, and as an intermediate in chemical and drug manufacture. Fast delivery by tank car from Philadelphia, or by tank truck from our supply depots in Boston, Buffalo, Chicago, Cleveland, Detroit, Indianapolis, Los Angeles, New York, Philadelphia, and St. Louis. Drum stocks at all of these points and at Charlotte, N. C.

INDUSTRIAL AROMATIC SOLVENTS You can count on a stable supply of solvents from Allied Chemical—and of the highest reliability, too. For Allied Chemicals' role in standardizing methods and specifications for ligroin distillates. If your plant is within 100 miles of one of our ten nation-wide tank stations, you get prompt delivery by tank trucks. And from most of our plants you can order acetones, glycols, and plasticizers for combination delivery. Our aromatic solvents.

Benzol, Nitration	Xylool, Nitration
Benzol, Industrial Pure	Xylool, Ten Distilled
Benzol, Industrial 90%	Xylool, Industrial
Benzene, Thiophene-free	Hi-Flash Solvent
Toluol, Nitration	1320 Oil
Toluol, Industrial Pure	Wire Enamel
Also available in Tank Cars	





NE Combine these unique high melting point, low solubility to water and to most organic solvents (at temperature), compatible with wax-like materials—and with styrene, the coating that is used in many varied applications. **Waxes:** improves gloss and reduces resistance to blocking by chemicals, increases tensile strength, cuts down on wax run on conventional **Plastics:** treatment with an emulsion improves tear resistance, crease recovery and ease of cutting. **For blending:** soaps, candles, electrical insulations, in many different operations continue to be discovered. Is there a need for a chemically inert liquid that is both tasteless and stable in organic liquids? A-C Polyesters can help solve your problems. Call us at for assistance.

PHTHALIC ANHYDRIDE Low cost, ease of handling, versatility...these, along with the outstanding chemical and physical properties it imparts, are reasons behind the growing demand for phthalic anhydride. Now the laboratories of Allied Chemical add another: exceptional purity. The result? Significant improvement in quality for alkyd and polyester resins, plasticizers, fine chemical syntheses and dyes, pharmaceuticals, and many other products. Our conveniently located plants and warehouses assure fast, dependable delivery of phthalic anhydride in liquid and flake form. Technical assistance upon request.

NIACIN In pharmaceuticals, in animal and poultry feeds, in the enrichment of flour, Niacin plays an important role. Naturally these applications demand the highest purity—and Plastics Division Niacin satisfies that demand. It meets the highest USP standards of purity and is recommended for use in the blending of vitamin premixes. All grades, including feed grain Niacin of 50% to 80% purity, are available from our manufacturing plant in Philadelphia and our warehouses in Los Angeles and Chicago.

TAR BASES Possibilities for these versatile chemicals seem almost limitless. Already tar bases have found important application in such diverse fields as water repellents, anti-histamines, and stabilizers for chlorinated solvents. So that you can explore their use in your industry, Plastics Division will be glad to send you samples and technical data.

OTHER CHEMICALS AND PRODUCTS

ACETOPHENONE
ADIPID ACID
CUMENE
CUMYLPHENOL
CYCLOHEXANOL
CYCLOHEXANONE
DIETHYLENE GLYCOL
ETHYL BENZENE
ETHYL GLYCOL
FLOTATION AGENTS
FUMARIC ACID
MALEIC ANHYDRIDE

(continued below)

AROMATIC SOLVENTS
A reliable supply of aromatic solvents—chemical—and they'll be available, too. For Allied played a major role in standardizing testing procedures and stations for light oil distillates. This is within 100 miles of every tank wagon station nationwide. Tank delivery by our own fleet is available in most of our stations, including xylenes, glycols, and phthalate esters. Combination delivery with other products.

Xylool, Nitration
Xylool, Ten Degree
Xylool, Industrial
Hi-Flash Solvent
1320 Oil
Wire Enamel Solvent
Cars.

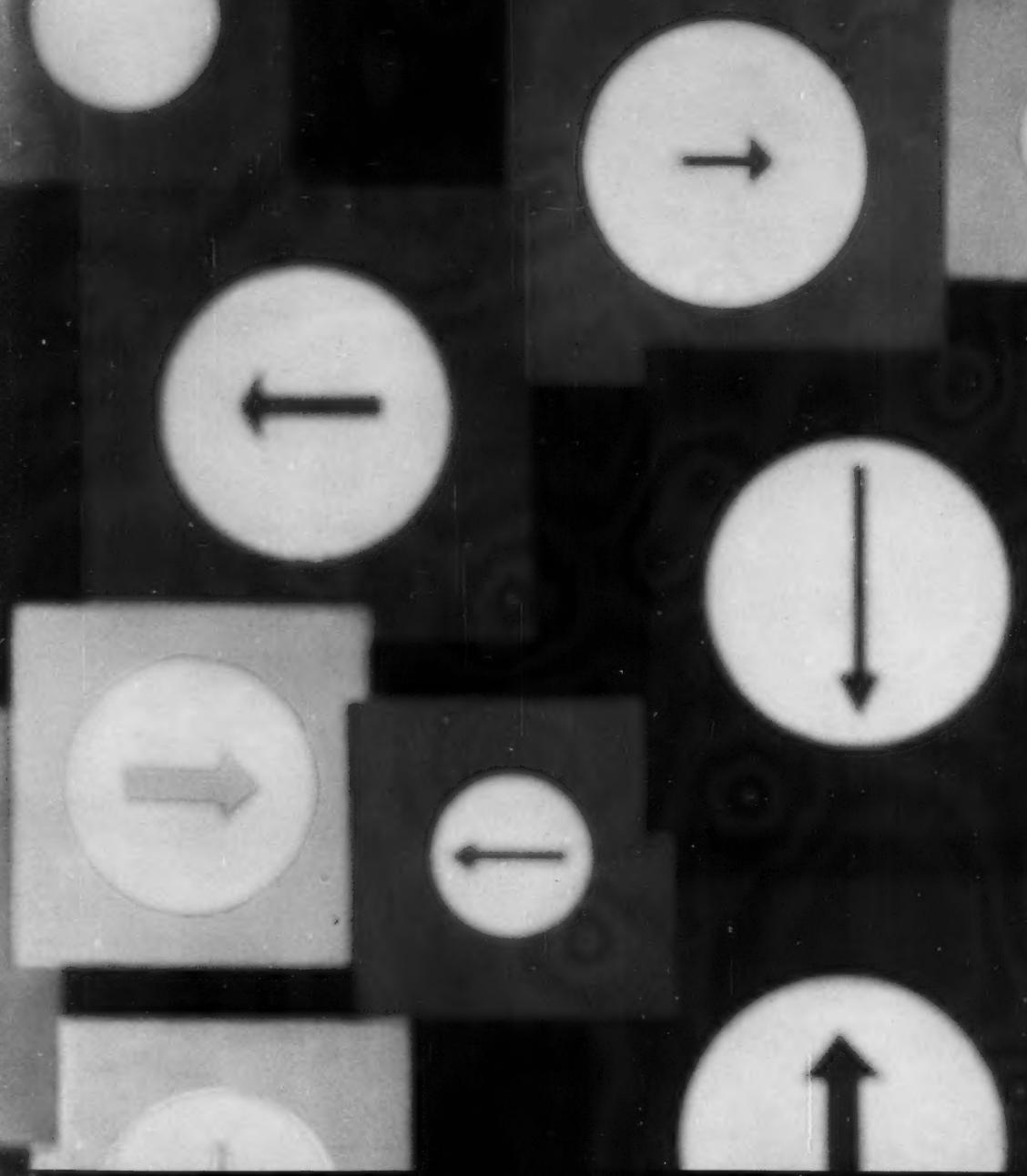
ALPHA-METHYLSTYRENE A low cost unsaturated aromatic monomer, our alpha-methylstyrene is produced by a cumene-phenol operation and is highly pure (99.5%+). It is used in styrenated alkyd resins...high-heat distortion polystyrene...polyesters...the manufacture of cumylphenol...ion exchange resins...and polymeric plasticizers. Alpha-methylstyrene also co-polymerizes with a wide variety of unsaturated compounds, including butadiene, terpenes, acrylates, methacrylates and most vinyl monomers.

ANTHRACENE Recent studies have revealed new and important information about anthracene reactions. Did you know that Diels-Alder adducts are potentially useful as intermediates for plasticizers, adhesives, tanning agents, synthetic dyestuffs, and synthetic beater sizes for paper? Or that Friedel-Crafts reactions with olefins provide resins and pour-point depressors for lubricating oils? Well, these are just a few of the many anthracene reactions that lead to commercially valuable products. Also, anthracene is photoconductive and reacts photochemically. (And our anthracene is 90-95% pure.)

CUMAR® RESIN
Because "Cumar" Resin ranks first in its field for purity and quality, it is well worth the little extra it costs. A versatile thermoplastic resin, it is available in nine separate grades. Most frequent applications: floor tile, aluminum paint, rubber products (both natural and synthetic), waterproofing materials and adhesives.

METHANOL
PICKLING INHIBITORS
RESIN S (A natural synthetic resin of high styrene content)
RUBBER COMPOUNDING MATERIALS
TAR ACID-OILS
TAR DISTILLATES





EXPRESS TANK TRUCK DELIVERIES OF PLASTICIZERS

Efficient handling and shipping in modern stainless-steel tank trucks assure prompt delivery of all the pure, uncontaminated Plasticizers you need. For express tank truck deliveries, call the Plastics Division office nearest your plant:

Boston	DAvenport 2-7460	Indianapolis	Clifford 5-5443
Buffalo	TR 3-3600	Los Angeles	NEvada 6-2306
Chicago	Michigan 2-1800	New York	HAnover 2-7300
Cleveland	Henderson 2-2020	Newark	Mitchell 2-0960
Detroit	VInewood 2-2500	Philadelphia	JEfferson 3-3000
Houston	WAlnut 3-2871	St. Louis	PLainview 6-3404

FOR THE LATEST INFORMATION ON COAL-TAR CHEMICALS . . . WRITE US, AND WE WILL SEND YOU HELPFUL PRODUCT DATA ESPECIALLY COMPILED FOR YOUR INDUSTRY. IF YOU WOULD LIKE EXTRA COPIES OF THIS FOLDER, ASK FOR FORM P.D. 350.

Allied
Chemical

BASIC TO AMERICA'S PROGRESS
PLASTICS DIVISION



Chemical air freight shipments abroad are expected to double after new lower rates take effect.

Chemical Air Cargo: Getting Set to Fly High

Next month transatlantic air freight rates will tumble 12-25% for chemical products. Example: on 101-200-lb. lots, the New York-London rate will be 41¢/lb. instead of 56¢/lb. Domestic air rates, too, may dip in the not-distant future. These two factors have stirred significant new interest in air freight among distribution men throughout the chemical process industries.

Chemical makers have been turning more often to air transport for both domestic and foreign shipping. American Airlines, for example, reports that last month it saw record shipments of chemicals by air. And Emery Air Freight, one of the country's fastest-growing air freight forwarders, expects a 200% increase in overseas air shipments of chemicals after the new rates go into effect.

But while chemical marketers are beginning to use air shipments more frequently—to open new, faraway markets, meet competition on rapid delivery, or reduce inventories—the increase cannot be termed a "breakthrough." Air freight shipments are still quite expensive, and delays sometimes nullify the prime advantage—fast delivery.

Going Abroad: The greatest interest in chemical air traffic concerns overseas business. Parke, Davis, for

example, ships 10% of its overseas volume by air, only 4% of its domestic business (on a poundage basis, of course, the domestic shipments far exceed the overseas ones). Union Carbide notes that over the past five years it has doubled its rate of overseas air freight shipments from 75/month to about 150. Harshaw Chemical (Cleveland) moves some 50-60% of its synthetic optical crystals abroad by air, looks for a 5-10% pickup in foreign air shipping because of expanded European operations.

But while domestic air freight shipments of chemicals trail export air shipments on a percent basis, the former are growing steadily. Merck says it now makes 75-100 domestic air shipments daily.

Biggest boosters of air freight in the U.S. (other than the airlines) are firms situated on the West Coast. They stand to compete more evenly in Midwestern and Eastern markets. Temescal Metallurgical Co. (Berkeley, Cal.) air-ships extensive quantities of its refractory metals to the East—often in 10,000-lb. lots. It believes that air freight becomes really competitive for products priced above \$1.25/lb.

Another West Coast chemical producer relying heavily on air freight shipments is Bio-Rad Laboratories

(Richmond, Calif.). Bio-Rad, with expected '61 sales of about \$500,000, ships nearly half of its overseas business by air, and receives all of its European-derived raw materials by air.

David Schwartz, Bio-Rad president, points up the importance of getting the firm's output to Eastern markets in two days rather than in the one-two weeks that has been customary for truck shipments. He says that fast air freight delivery also helps his firm reduce the production lead-time required and lets it cut back its inventory and warehousing costs. Bio-Rad air-ships bulk quantities of products to the New York area, then distributes the individual orders immediately. It has no Eastern warehouse—a key factor in its saving of more than \$2,000/month.

Airborne Chemicals: As the air freight rate for chemicals has dropped, the range of chemical commodities considered suitable for air-shipping has widened. Pharmaceuticals and biologicals—particularly those that are perishable—have long been popular items for air delivery. Now, the list has lengthened considerably to include radioactive compounds, catalysts, rare metals, metal-organics, insecticides, synthetic gem stones, lubricants, cleaning chemicals,

SALES

paints, varnishes and bulk chemicals.

New rates (effective Sept. 1) may even lure new products into air freight. But most chemical distribution men look for the real breakthrough to occur within a few years—when air freight costs, which now average from 15-20¢/ton-mile, sink to 7-10¢/ton-mile.* Earl Johnson, president of General Dynamics Corp., recently said he felt that U.S. air freight tonnage might shoot to 5.5 billion ton-miles (from 1 billion now), provided the costs could be brought down to about 15¢/ton-mile. And 25 billion ton-miles of air freight business is in sight, according to Johnson, if a 10¢/ton-mile cost can be achieved.

Hollis McKeag, assistant to Dow Chemical's traffic director, however, figures that a cost of 7¢/ton-mile is needed before chemical cargoes become a truly big-volume item for the airlines.

CW finds that while many air freight salesmen see their chemicals "market" pretty well limited to products costing \$2/lb. and up, some chemical traffic men are air shipping products in the \$1-1.30/lb. range. These traffic men point out that air freight rates are sliding downward while the price level at which new

* On shipments going 1,000 miles or more.

products are introduced is climbing.

Paradox: While many of the advantages of air freight shipments—fast delivery, reduced backhauls, minimized production lead-time requirements—are widely appreciated, chemical marketing men still differ markedly on the effects of air freight movements on inventory needs.

Both Dow's McKeag and Parke, Davis's R. C. Turpening, assistant traffic manager, feel that today's demands for tight inventories tend to work against air shipments. Others feel they can reduce their inventories significantly by employing air freight deliveries.

Still another somewhat paradoxical fact about CPI firms' use of air freight is that many companies seem to drift into using it. Reason for this, according to Edward Feeney, market research manager for Emery Air Freight, is that today's competitive business conditions and low inventory requirements often make rapid supply vital—and a company suddenly finds it must turn to shipping by air.

Of course, some chemical marketers report that their customers usually pay for the extra costs of air shipping if they request it. But others consider rapid delivery an important enough competitive point (*CW*, July 1, p. 25)

to justify absorption of these costs.

Another important and fast-gaining reason for air freight shipments: fast distribution of product samples, advertising and trade show materials and limited quantities of products for test-market activities. Some CPI companies use air freight to ship transferred employees' household goods.

Outlook: There's little doubt that air freight has a long way to go before it hauls a significant tonnage of chemical output. And it's noteworthy that one user of air freight—Dow—reports that it now ships no single product consistently by air, and that its annual air freight costs are less than \$70,000. But at the same time, few marketing or distribution men deny that air freight promises many advantages once the costs come down some more.

McKeag, voicing a widely held view, says, "We look upon air freight as an auxiliary that will be used more frequently."

Doubtless, much of the current growth in chemical air freight movements stems from the highly competitive tenor of the industry. And, since chemicals and related products represent one of the two biggest air freight markets, there's little doubt that the CPI will be courted ardently.



Vital to fast air shipping is rapid yet thorough handling during truck pickup, weighing and loading.

"ATLAS" has been our name for 49 years...and it still is. However, we're now "Atlas Chemical Industries, Inc."

"Atlas Powder Company," our former corporate name, became less and less descriptive as we grew and diversified into fields other than explosives. Four moves, made since early 1959, emphasize our diversification...

Our Chemicals Division is building a plant to make initially about 50,000,000 pounds per year of glycerin, ethylene glycol and other glycols.

Our Explosives Division is building, and will operate for Solar Nitrogen Chemicals, Inc., a \$15,000,000 facility for making ammonia, urea and related products.

Solar is owned equally by Atlas and The Standard Oil Company (Ohio).

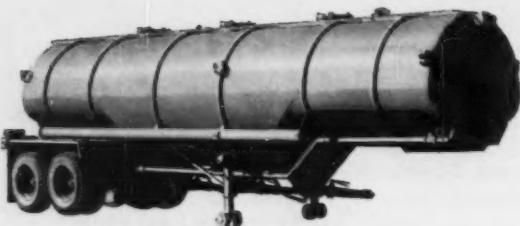
Our International Division was formed to take over export of all Atlas products, and to direct and expand manufacturing and marketing operations outside of the United States.

The Stuart Company was recently merged with and into Atlas. As an Atlas Division, it will continue to manufacture and market ethical pharmaceuticals.

The "Powder"—or explosives—business is still important to us, and we expect it to remain so. Diversification into several chemical fields led us to change "Powder" to "Chemical," and to bring all our corporate operations together under "Industries." So, our new official corporate name is "Atlas Chemical Industries, Inc."... while the past lives on as we retain our original NYSE ticker symbol—"APC." We hope you like the new name...and that you'll continue to call us "ATLAS."

ATLAS
CHEMICAL INDUSTRIES, INC.

CHEMICALS DIVISION—polyols, emulsifiers, polyester resins, activated carbons, specialty chemicals. ■ **EXPLOSIVES DIVISION**—high explosives, blasting agents, blasting supplies; nitrogen chemicals; ordnance products. ■ **INTERNATIONAL DIVISION**—export; manufacturing and marketing operations outside of the United States. ■ **THE STUART COMPANY DIVISION**—ethical pharmaceuticals.



Hopper Pressure Tank-Trailer

—for hauling salt, granulated phosphates, ammonium nitrate prills, granular fertilizer components and cement. Phenomenal discharge rate!



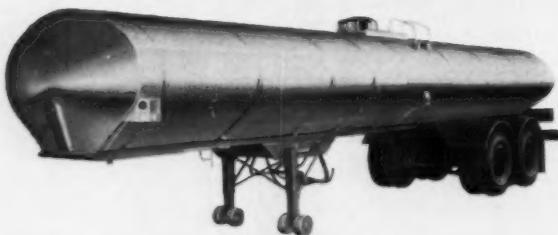
6200 Series Steel Petroleum Tank-Trailer

—for hauling gasoline, kerosene, benzine, lubricating oils, alcohol, solvents, diesel fuel, and aviation fuels.



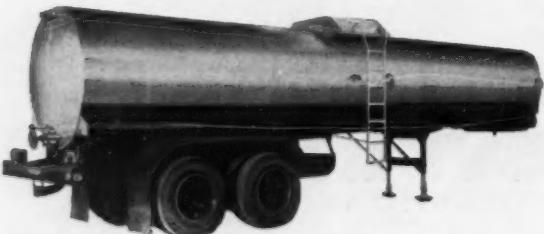
7100 Series Aluminum Tank-Trailer

—for hauling gasoline, chemicals, fertilizer, kerosene, benzine, lubricating oils, alcohol, solvents, diesel fuel, and aviation fuels.



Stainless Steel Insulated Sanitary Tank-Trailer

—for safe transportation of edible products such as vegetable oils, water, salt solutions, vinegar, liquid sugar, yeast, dextrose, etc.



Insulated Hot Materials Tank-Trailer

—for transporting hot materials such as tallow, tar, asphalt, paraffin, molasses, hot oil, wax, pitch, resin, and glue.

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"ENGINEERED TRANSPORTATION
—*The Key to Transportation Savings*

Flammables . . . bulk commodities . . . chemicals . . . edible cargoes . . . asphalt . . . whatever your product, Fruehauf has the world's broadest line of liquid and bulk transporters to meet your hauling needs.

For over 46 years Fruehauf engineers have been designing and producing superior Truck-Trailers to meet the constantly changing requirements of professional haulers, whose sole source of income comes from the equipment they operate.

At Fruehauf's four large, modern tank production centers—Fort Wayne, Indiana, Fresno, California, Omaha, Nebraska, and Uniontown, Pennsylvania—Tank-Trailers are being produced to rigid quality control standards for a multitude of dry and liquid hauling requirements.

In addition, Fruehauf's nationwide chain of branches provides fast, efficient, competitively-priced service wherever your vehicles operate.

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TYPES OF FRUEHAUF TANK-TRAILERS (1) _____

(2) _____ (3) _____

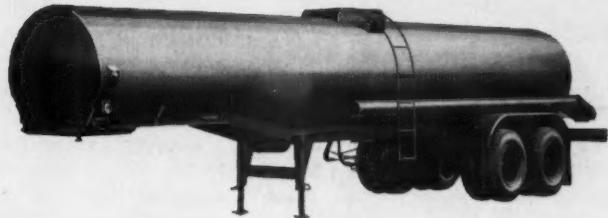
(4) _____ (5) _____

Name _____ (PLEASE PRINT)

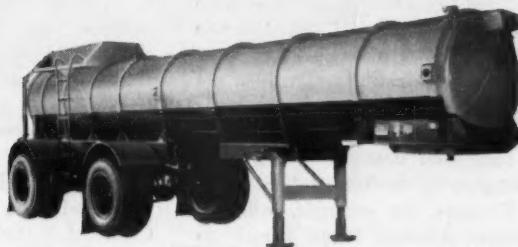
Company _____

Address _____

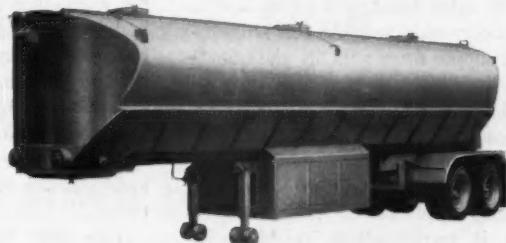
City _____ State _____



Clean Design Utility Steel Tank-Trailer
—for hauling crude oil, hot road oil, non-edible lard, tallow and fats, non-corrosive heavy chemicals and lubricating oils.



Steel Acid Tank-Trailer
—for specialized transportation of acids, liquid chemicals, acid and alkaline commodities.



Screw Type Aluminum Bulk Flour Tank-Trailer
—for hauling bulk flour, mixed feeds, and a multitude of non-corrosive bulk chemicals.



Aluminum Triple Panel Bulk Flour Tank-Trailer
—for sanitary, fast, efficient, low cost transport of bulk flour and non-corrosive bulk chemicals.



Airlide* Pneumatic Pressure Tank-Trailer
—for hauling soda ash, ground phosphate, silica flour, gypsum, vinyl chloride, calcium anhydrite and similar sensitive and hard-to-handle materials.

Triple Play in Panels

Birth of a new Koppers Panel Dept., split off from the company's Plastics Division (Pittsburgh); broader panel marketing plans at U.S. Rubber's Naugatuck Chemical Division (Naugatuck, Conn.); and the first full-scale production of Borne-Lite's (Landover, Md.) cast acrylic sheets—all reflect new sales drives designed to win a bigger portion of the growing market for plastic sheet and panels.

Koppers and Naugatuck have made their moves in the past few weeks, yet their sales strategies — aimed at a fast-growing market — differ widely. Koppers, for example, will use company salesmen to go directly to building tradesmen with its Dylite polystyrene panels and, at the same time, develop licensing arrangements where markets look good. Naugatuck, on the other hand, will move first to a country-wide network of architectural supply firms with its glass fiber-reinforced flat sheets (Tropiglas) and acrylic and polyester sandwich panels (Tropicel).

Meanwhile, Borne-Lite, with an eye to sales in plastic signs rather than building applications, tries a third way: it merchandises its Monocote only to fabricators, leaving final panel shapes up to them.

Panel Production: Unlike the other two firms, which handle basic production themselves, Naugatuck acts primarily as a middleman, selling panels made for it by Russell Reinforced Plastic Corp. (Lindenhurst, N.Y.).

Right now polyester-based products make up a large part of the production arrangement, but a big switch-over may be in the offing. Naugatuck, which has handled the line since '56, sees the best sales prospects in acrylic panels. It feels that the acrylics, though nominally more expensive, stand up better than polyesters under weathering and give a more luxurious indoor appearance. As a result, polyester panels, already dropped by Naugatuck for outdoor use, are due for some serious competition in the interior construction market also.

Koppers isn't directly competing with either Naugatuck product. Its Dylite panels — just a few steps removed from the laboratory—are basically a polystyrene core jacketed by various materials — e.g., aluminum,

gypsum, plywood, or some other plastic.

Koppers' only producing facility, a former Detroit automobile plant with a capacity to supply panels for only about 1,000 houses/year, is still largely a pilot operation. But Koppers feels strongly enough about Dylite's future to have formed the new Panel Dept.

Signs, Too: Plastic panels are also doing well in nonconstruction markets. In signs, for one, they are increasingly popular — some observers predict that by '70 synthetic resins will capture 80% of this market, now held chiefly by metals and glass.

Borne-Lite, a subsidiary of Borne Chemical, is the newest firm to gain a foothold here, now has full-scale production of Monocote, a cast acrylic sheeting.

The company's current plans call for marketing strictly to fabricators; and the prospects look favorable enough for Borne-Lite to predict production of 1 million lbs. of sheeting this year, 2 million lbs. in '62. Management says its giant-size panel—up to 72x96 in. — and the lack of any surcharge are top Monocote sales features.

This wide variation in the three companies' sales plans indicates that the panel market is wide open to innovation. All the plans reflect chemical processors' determination to invade the construction field.

Still Faster Service

Two more distribution changes by chemical producers this week continue the industry's current drive to improve service and speed product deliveries to customers (*CW, July 1, p. 25*).

Hercules Powder Co.'s Pine and Paper Chemicals Dept. has appointed six new synthetic resin distributors—all member companies of the Solvents and Chemicals Group—in an effort to place stock points near areas of high customer concentration, thus improve delivery time and service. Their locations: Cincinnati, Louisville, Indianapolis, Detroit, Dallas and Houston.

And Shell Chemical Co. will construct bulk storage facilities for hydrogen peroxide at Charlotte, N.C., to provide faster delivery to the textile, furniture and paper industries in the Carolinas, Georgia and Virginia.

Teaching Customers

Management at International Minerals & Chemical Corp. (Skokie, Ill.) is sizing up early customer reaction to its latest fertilizer marketing innovation: a three-day fertilizer management seminar held two weeks ago for about 75 executives of IMC's customer companies.

First indications are that customers are pleased.

More 'Full Orbit': The just-completed course is the latest twist in IMC's "full orbit" sales program — now in its fourth year. This program is designed to strengthen the company's position as a fertilizer raw-materials supplier by providing extensive customer service.

This effort at first encompassed a wide variety of marketing training programs, special meetings and extensive customer advice. Then IMC decided to go all out, give a complete course in how to manage a fertilizer business.

It was this basic program that was broadened for this year's presentation. It now covers virtually every phase of fertilizer manufacture and marketing, including administration, finance, accounting, purchasing, personnel development, marketing, advertising and promotion, transportation—even local community relations. And IMC decided to include much more information on long-term industry trends in this year's program, after surveying their customer guests.

Also, IMC gives seminar attendees a 450-page hard-cover book for later reference. It contains the full set of manuals used by IMC in its full-orbit program, plus the complete scripts of the just-completed meeting — developed around the problems of a hypothetical 12-man fertilizer company tabbed The Makmor Co. The book is the result of more than four years' work, cost IMC some \$12.50/copy. (It is not available for general distribution.)

Getting Results: IMC's marketing vice-president, Anthony Cascino, tells *CHEMICAL WEEK* that results of the full-orbit program are tough to evaluate precisely. But, he says, sales have increased steadily each year since the beginning of the campaign — and the sales boost has more than outpaced the increased promotional expenditures — some 22% above '56-'57.



Unique keto-ether structure of Shell Chemical's new Pent-Oxone high boiling solvent. COC of ethers and double bond O of ketones unite in this single Pent-Oxone solvent molecule to give you double solvent action.

VINYL SOLVENT:

Vinyl lacquers made with Shell

**Chemical's new Pent-Oxone* high boiling solvent
cost less and smell better**

Pent-Oxone solvent costs 17.5¢ per pound delivered in tank cars. It is mildly camphor-like in odor. It is a good solvent for vinyl resins and displays a high tolerance for hydrocarbon diluents.

Read how this remarkable Shell Chemical keto-ether compares with other high boiling vinyl solvents in evaporation and solution viscosity. And where to send for newly issued Pent-Oxone solvent technical bulletins.

PENT-OXONE is the only commercially available solvent which gives you both ketone and ether functional groups in a single molecule.

It is a true high boiler with an even evaporation rate midway between the evaporation rates of EGME acetate and cyclohexanone.

Low cost, high dilution, excellent solvent

Three qualities of this unique Shell solvent contribute to its lowering your costs on vinyl lacquers:

First, Pent-Oxone solvent has a comparatively low cost of 17.5¢ per pound, or \$1.325 per gallon, delivered in tank cars.

Second, Pent-Oxone can tolerate any amount of aromatic diluent within the practical formulating range in vinyl chlo-

ride/vinyl acetate copolymer solutions.

Third, Pent-Oxone is an excellent high boiling solvent for vinyl resins.

In addition, Pent-Oxone solvent's mildly camphor-like odor is more agreeable than the odors of other high boiling vinyl resin solvents.

High boiler comparison

As you might expect, Pent-Oxone's remarkable keto-ether structure gives it excellent solvent properties.

Here are viscosity comparisons with cyclohexanone on three week-old Vinylite** resin solutions:

15%	Pent-Oxone/MEK	43 cps.
VYHH	cyclohexanone/MEK	44 cps.
15%	Pent-Oxone/MEK	44 cps.
VMCH	cyclohexanone/MEK	46 cps.
15%	Pent-Oxone/MEK	62 cps.
VAGH	cyclohexanone/MEK	55 cps.

Both solvents were mixed 50/50 with Shell's MEK to reflect more accurately finished formulations, then diluted 50/50 with toluene.

New technical bulletins

New technical bulletins are now available from Shell on a variety of Pent-Oxone solvent applications.

One deals with Pent-Oxone solvent in vinyl lacquers. Another deals with Pent-Oxone and its twin, Pent-Oxol* glycol ether, in acrylic formulations. A third gives property data on both these solvents.

For copies of these bulletins, plus samples, contact any of Shell's nine Industrial Chemicals Division offices, or write Shell Chemical directly at 110 West 51 Street, New York 20, New York.

*Trade mark, Shell Chemical Company

**Trade mark, Union Carbide Corp.

**Shell
Chemical
Company**



Industrial Chemicals Division

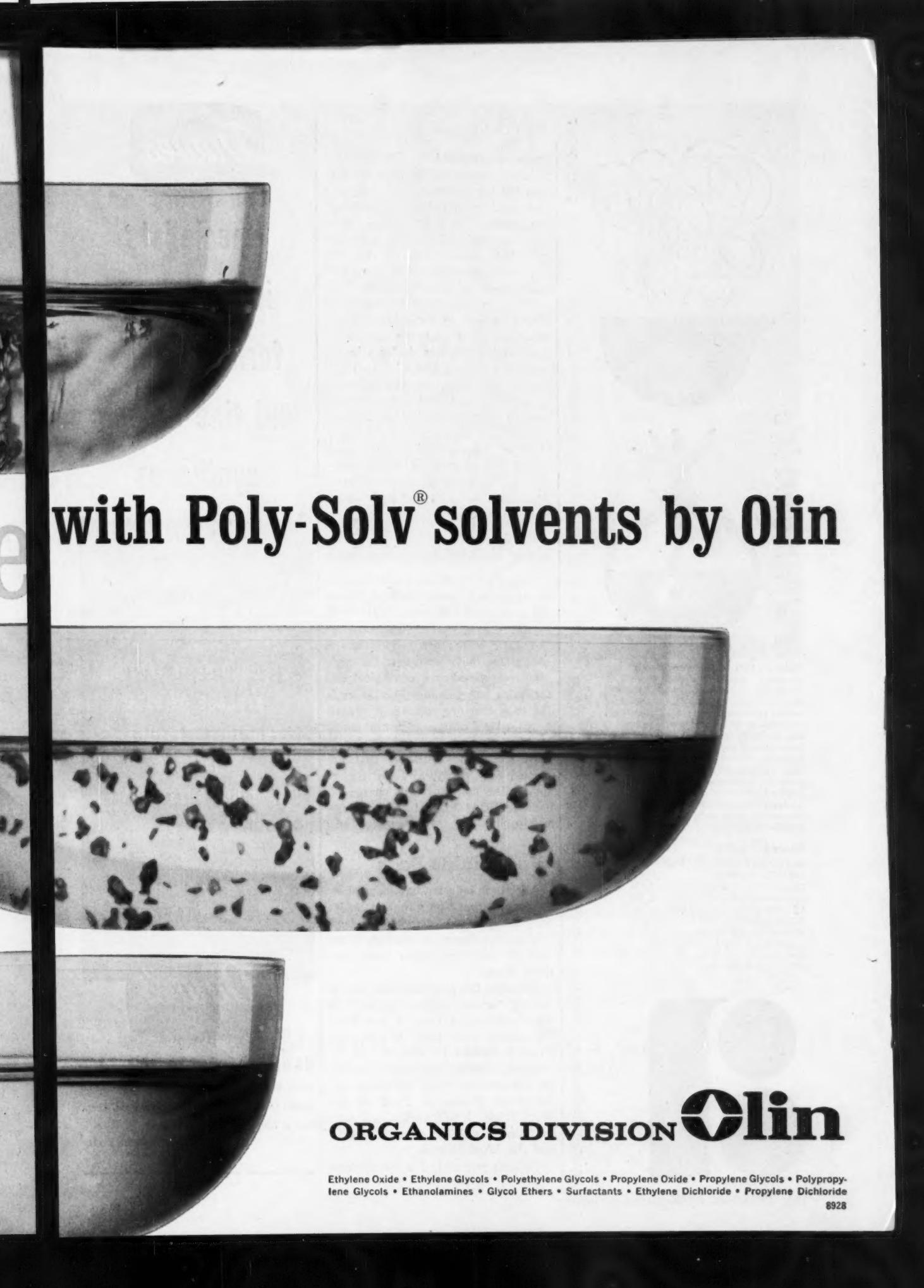


Problems dissolve

The many glycol ethers in the Poly-Solv® series have several properties in common. Of prime importance to you: outstanding solvency qualities. In addition, they are clear, almost odorless, high-purity liquids completely miscible with water and most organic solvents. Beyond this, however, each Poly-Solv product has individual characteristics of viscosity, boiling point, vaporization heat, etc. Whatever your process, there's a Poly-Solv to fit your requirements.

As in all Olin chemicals, Poly-Solv product quality is backed by technical assistance and personal service. If you have a solvency problem, write or call OLIN MATHIESON, Organic Chemicals, 745 Fifth Avenue, New York 22.





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ORGANICS DIVISION 

Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Propylene Oxide • Propylene Glycols • Polypropylene Glycols • Ethanolamines • Glycol Ethers • Surfactants • Ethylene Dichloride • Propylene Dichloride

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sulfur dioxide

People are the real difference between products . . . especially products like SULFUR DIOXIDE. For 45 years An sul has been manufacturing Liquid Sulfur Dioxide of reagent grade purity and providing American industry with technical consultation in its use. Available in tank car quantities, An sul Sulfur Dioxide finds a variety of uses, including: acidifying and/or neutralizing agents, bleach, solvent, anti-oxidant, anti-chlor, bacteriostatic and fungistatic, fumigant, polymerizing agent. For samples, our latest technical bulletins or problem-solving consultation please write ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN.

PROPERTY DATA

MOLECULAR WEIGHT . . . 64.06

SPECIFIC GRAVITY

Liquid: Water = 1 @ 0°C (32°F) . . . 1.434

Gas: Air = 1 @ 0°C & 760 mm . . . 2.2636

MELTING POINT . . . (-103.9°F) . . . -75.5°C

BOILING POINT . . . (14°F) . . . -10.0°C

REFRACTIVE INDEX

Liquid: (I.C.T. 1,107) . . . n_D^20°/D(68°F) . . . 1.410

Gas: (Mellor, J. W. Vol. X, 197) . . . n_D^15°/D

(59°F) . . . 1.000686

REFRIGERATION PRODUCTS • FIRE FIGHTING EQUIPMENT

INDUSTRIAL CHEMICALS

SALES

levels — required by the program.

Some customers, in their enthusiasm for IMC's effort, have suggested that seminar attendees pay more of the costs in the future (IMC footed bills for food and housing, attendees paid their own travel costs). And two customers even sent orders along with their letters of congratulation.

IMC, in extending its marketing efforts, is now in the middle of another phase of customer service — encouraging stronger dealer sales by providing meeting kits, advice on selling by telephone, the use of credit as a selling tool, and suggestions on how to conduct meetings of farmers.

IMC's reputation and "image" as a fertilizer raw-material supplier have soared as a result of its extensive service. But more significant to management, IMC sales and profits have been improved.

New Easy Opening Bag

Last week St. Regis Paper Co. unveiled a novel device for easily opening sewn multiwall paper bags—both open-mouth and valve varieties.

Feature of the new Grip-N-Rip: a strong tape that's sewn over the bag's seam tape, providing a convenient tab for quick bag opening. The device is for bags that are commonly opened fully—typical of most industrial multiwalls—and for consumer packages of lawn seeds and fertilizers that are opened only partly, to form a pour spout. The company will charge an additional 50¢/1,000 bags for Grip-N-Rip.

Wool Fights Back

The wool industry has mapped its projected promotion program (*CW, May 27, p. 102*), designed, at least in part, to preserve its markets in the face of stiff competition from synthetic fibers.

Handling this program, described as costing "several million dollars," is the Coordinating Council for Wool Promotion in the U.S., an eight-man board composed of directors of the American Sheep Producers Council, the International Wool Secretariat and the Wool Promotion Fund of the Wool Trade. It will work closely with the American Wool Council (AWC) and the Wool Bureau.

Heading one end of a two-pronged

SALES

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SALES



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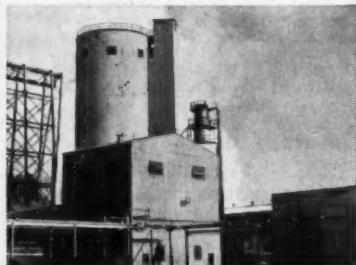
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NEW SOHIO METHOD HOLDS KEY TO SUPERIOR UREA QUALITY

HIGH PURITY LEVEL OF NEW SOLAR UREA MEETS COMPLETE RANGE OF APPLICATIONS

LIMA, OHIO — Superior quality is the major characteristic of a process now being used by Solar Nitrogen Chemicals, Inc., in the production of high-purity Solar Urea. This new manufacturing method is the Vulcan-Inventa process with a Stora-Vulcan evaporator. So dramatic is performance that urea users are developing new yardsticks for judging urea quality — particularly for applications in U-F resins, molding powders, textiles and coatings.

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For a production sample of new Solar Urea, write to Sohio Chemical Company, P.O. Box 628, Lima, Ohio.

SALES

attack, AWC will continue promotion and education efforts with mills and knitters, branching out to the cutter and retail levels in merchandising, sales promotion and sales training.

Further educational work — involving fabric demonstration and instruction — will be aimed at schools, civic and fraternal groups. For the more technical promotion, the Wool Bureau expects to push product developments that will simplify care and maintenance of wool products.

Market Specialization

Last week, Monsanto Chemical Co.'s Inorganic Chemicals Division began a move to further specialize some of its marketing activities — a trend that has been under way for some time among chemical process companies (*CW*, May 6, p. 65).

The division has formed a market development group designed to allow technical service staffers to concentrate on assisting customers rather than on longer-range market development activities.

The new move stems in part from technical service men's difficulties in completing long-range projects in the face of shorter-range service needs. The division doesn't say how many staffers it has assigned to the new unit or to its technical service staff, but it does say that both organizations are "expanding."

DATA DIGEST

- Inhibitor Sweetening:** Brochure outlines various methods used in gasoline "sweetening" (countering the odoriferous constituents), describes materials used, the probable reaction mechanism and the variables that affect inhibitor sweetening. Also included: a simplified method of determining gasoline response to this process. Eastman Chemical Products, Inc. (Kingsport, Tenn.)

- Plastics Chemicals:** Two data sheets outline physical properties, suggested formulations and applications of chemicals for plastics production. No. 23 describes a modifier of low-temperature properties of PVC. No. 24 describes a copper greening inhibitor for PVC, especially when the polyester plasticizers are derived from sebacic or adipic acid, or diesters of

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Chemical Week

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SALES

adipic acid. Plastics Chemicals Division, The Geigy Co., Ltd. (Rhodes, Middleton, Manchester, England).

• **Water Repellants:** Product data sheet lists properties and applications of air-curing, water-repellant silicones for leather, paper and textiles. Silicone Products Dept., General Electric (Waukegan, N.Y.).

• **More Plastics:** New data sheets listing physical properties bring Phillips Chemical Co.'s (Bartlesville, Okla.) resin list up to date on both high- and low-density tailored resins.

• **Extender Pigments:** Brochure outlines physical properties, development and property-measurement procedures for a new group of surface-modified aluminum silicate pigments. Uses: improved adhesion for paints, reduced viscosity for plastics and emulsification-resistance for inks. Minerals & Chemicals Philipp Corp. (Menlo Park, N.J.).

• **New Catalog:** Folder offers eight chemicals in development quantities and 13 in commercial volume, as well as a number of complete product brochures. Special fields of interest: sulfur dioxide, sodium bisulfate, methyl chloride, nitrogen heterocyclics, organic arsenicals and methylated products. Ansul Chemical Co. (Marinette, Wis.).

• **Acids, Anhydrides:** New, 48-page booklet describes properties and uses of organic acids and anhydrides. Data covers acrylic, sorbic and valeric acids and acetic, propionic and butyric anhydrides. Information on physical properties—presented in graphs and charts—includes specification limits, toxicological data and constant-boiling mixtures. Union Carbide Chemical Co. (270 Park Ave., New York 17, N.Y.).

• **Polyvinyl Alcohols:** Brochure deals with two hydrolyzed polyvinyl alcohols, covers their applications in paper, adhesives and textiles, and describes physical properties and handling, including modifications by precipitants and extenders. Air Reduction Chemical & Carbide Co., division of Air Reduction Co. (150 East 42nd St., New York 17, N.Y.).

• **Processing Ingredients:** Sixteen-page catalog lists company's line of processing chemicals, with brief description of each item and its end-uses in textiles, pharmaceuticals, food products. Jacques Wolf & Co., subsidiary of Nopco Chemical Co. (60 Park Pl., Newark 1, N.J.).

Tracers TO THE CHEMICAL PROCESS INDUSTRIES

POSITIONS VACANT

A Director of Research-Coatings Research Group, Inc., twenty American and Canadian paint companies to assume full responsibility of operation central research laboratory. Minimum MS Degree Organic Chemistry. Experience in trade sales, emphasis vehicle development requisites. Excellent opportunity for qualified individual. Salary commensurate with ability and experience. Submit complete resume, including photographs, salary requirements and references, to Hiram P. Ball, President, CRGI, c/o 1486 Butler Plank Road, Glenshaw, Pennsylvania. Replies strictly confidential.

Chemist, Development of cleaning compounds and other chemical specialties. Five years experience desirable. Outstanding potential for future with growing Indianapolis company. Submit complete resume to H. L. Green, Vice President-R&D, Bruin & Company, 2939 Columbia Avenue, Indianapolis 7, Indiana.

Production Superintendent, Edible oil refining and packaging, lard, shortening, etc. Must be experienced and capable of assuming full responsibility for production, quality control, personnel, cost reduction, product improvement maintenance. P-7175, Chemical Week.

Sls. Mgr., Heat Exch., top Eastn Co. needed; Engg., blnd., ept., exp., sale exp. Send resume to P-7182, Chemical Week.

Our small, rapidly growing chemical manufacturing company has an opening for a chemical engineer to be responsible for Plant Engineering. Work also includes process and project engineering. Minimum B.S. degree in chemical engineering with five years experience including some Plant Engineering and direct supervision of personnel. Salary commensurate with experience, full benefits. All replies confidential. Reply P-7203, Chemical Week.

SELLING OPPORTUNITY AVAILABLE

Experienced Salesman-Industrial Chemicals: to handle sale of plasticizers, intermediates, and coal chemicals in major Eastern territory. Must have at least three years experience in chemical sales and degree in Chemistry or Chemical Engineering. Write, in confidence, to Sales Manager, Industrial Chemicals Division, Pittsburgh Chemical Company, 2000 Grant Building, Pittsburgh 19, Penna., giving background and qualifications.

Experienced polymer latex salesman for the paper and paint industry wanted to cover Wisconsin paper area. Salary commensurate with experience. Reply to: W. E. Driscoll, Borden Chemical Company, 2N581 York Road, Elmhurst, Illinois.

POSITIONS WANTED

Do you need foreign management? Graduate engineer available. Presently president solvents and chemicals company, foreign location. Age 54, Spanish and English. PW-6937, Chemical Week.

Available soon-Chemical Engineer Degree-Experienced in R&D on metal plating cleaners, dairy products, drawing compounds, maintenance cleaners, etc. Have experience in purchasing, production scheduling, customer service, shipping and billing procedures, and detergent applications. P-7156, Chemical Week.

Sales or Management: Detergent Chemist, 35, married, 11 years experience in lab, development, manufacturing and selling. Desires growth opportunity. FW-7208, Chemical Week.

SELLING OPPORTUNITIES WANTED

Wanted: One additional line by manufacturers rep., in N.E. Prefer color & pigment line. Currently selling to the paint, plastic and rubber industries. Reply P.O. Box 285, Essex Station, Boston 12, Mass.

BOOKS

For recovery of precious metals catalysts, solutions send for recovery schedule. Precious Metals Recovery Corp., 85 River Road, Nutley 10, New Jersey.

PROFESSIONAL SERVICES

Clark Microanalytical Laboratory—CH. N. S. Halogen, Fluorine, Oxygen, Alkoxyl, Alkimate, Acetyl, Terminal Methyl, etc. by specialist in organic microchemical analysis. P.O. Box 17, Urbana, Ill., Empire 7-8406.

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Custom Grinding-Ultra Fine or Course-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete CO₂ installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

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For Sub-Lease-Chemical Manufacturing Facilities in Chemical Industries Park, Newark, N. J. Zoned for pilot plant or chemical manufacturing, 4600 sq. ft. plant is of brick construction and is open to three-story height. Facilities are adjacent to railroad siding. Plant is equipped with kettles, steam facilities, special heating equipment. FL-7153, Chemical Week.

For Sub-Lease-Fully Equipped Polymer Laboratory Facilities in Chemical Industries Park, Newark, N. J. Handy to transportation, residential districts, metropolitan areas. Two 20'x30' laboratory areas; 20'x30' director's office and library; 30'x30' general office; 80 linear feet of bench space, fully equipped with individual storage facilities, gas, air, and water outlets, and bowls. Two double, explosion-proof hoods. Wired for 400 amp., 3-wire, 3-phase, 230 volt service. Completely furnished with desks, library equipment, lighting. All furnishings, equipment and improvements one year old. Immediate occupancy; sub-lease available to 8/31/64. FL-7148, Chemical Week.

SPECIAL SERVICES

Need Vacuum Drying? Vacuum shelf dryer time available for next 6-8 months. Northern New Jersey location. Reply SS-7144, Chemical Week.

EQUIPMENT FOR SALE

Multi-million dollar chemical plant liquidation at North Little Rock, Arkansas. Stainless Steel tanks, heat exchangers, pumps, pipe, valves, etc.; Pfaudler glass-lined kettles & reactors; Worthington #LTC-4 3500 cfm air compressors; Duriron exchangers & columns; Lead-lined tanks, concentrators, etc. Send for detailed circular. Perry, 1415 N. 6th St., Phila. 22, Pa.

Pfaudler 1400 gal. blue-glass lined jacketed kettle, stainless cover. Agitator, adj. baffle. Perry, 1415 N. 6th St., Phila. 22, Pa.

Heat Exchanger, T316 Stainless, 1960 sq. ft. ASME code 75 psi WP. Perry, 1415 N. 6th St., Phila. 22, Pa.

Reactor, T316 Stainless, 1000 gal., jacketed, ASME code. Perry, 1415 N. 6th St., Phila. 22, Pa.

21,500 gal. 316 ELC Stainless crystallizer tank, 14' dia. x 15' high 11' cone bottom. $\frac{3}{8}$ " welded. Perry, 1415 N. 6th St., Phila. 22, Pa.

Vulcan 78" dia. x 35 plate copper distillation column, bubble cap. Perry, 1415 N. 6th St., Phila. 22, Pa.

60,000 Pounds Activated Alumina, 4-8 Mesh, Grade F-1. Contact: Stephen Chazen, SMC Industries, Inc., Hooker Road, Chattanooga 10, Tennessee.

Glass Blowing Lathes adaptable to your specifications under one thousand dollars. P.O. Box #286, Bogota, New Jersey.

CHEMICALS FOR SALE

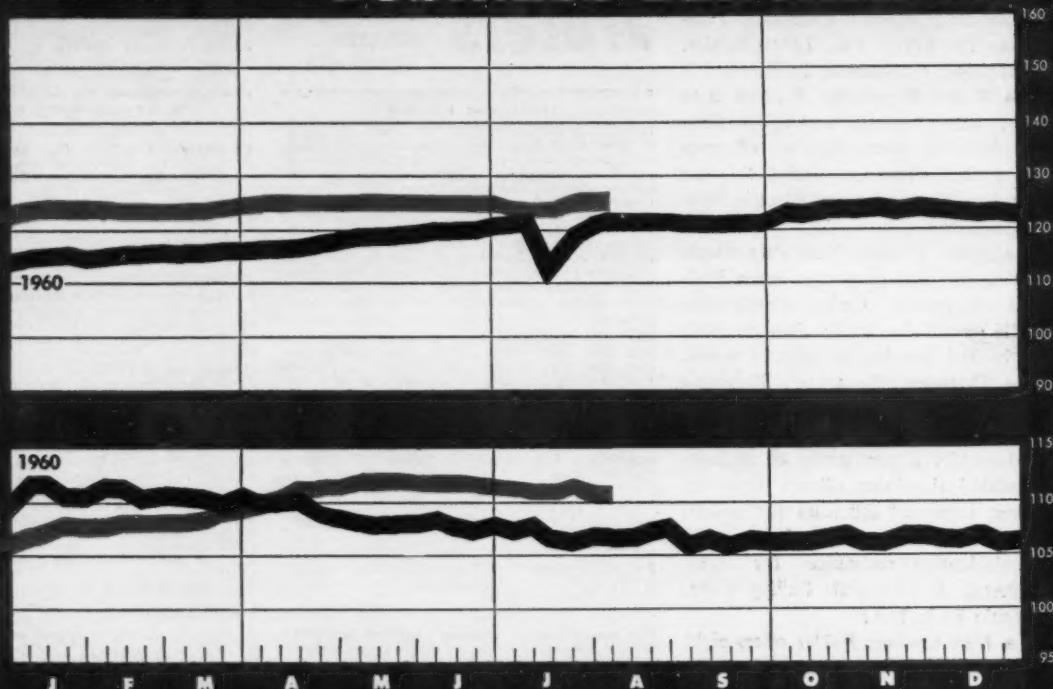
Chemical Grade Iron Powder—20 Mesh. Large tonnage available. Contact: Robert Craig, Micro Metals Corp., 99 President St., Passaic, N. J. Prescott 8-5689.

EQUIPMENT WANTED

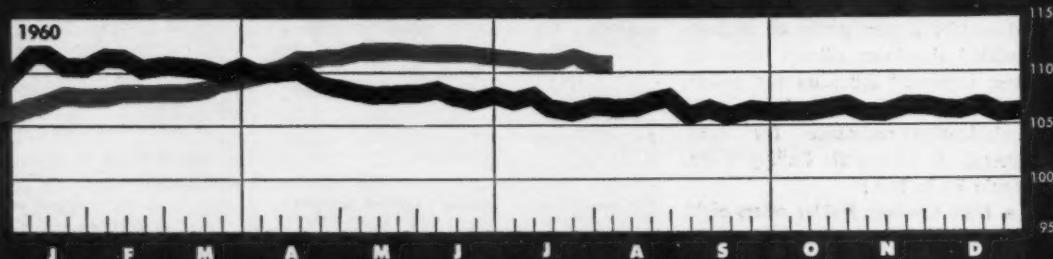
600-800 sq. foot SS Heat Exchanger-3" off SS Viking or Moyno pump, 6 foot dia. by 6 foot straight side S.S. closed vessel with S & D heads. W-7207, Chemical Week.

BUSINESS BENCHMARKS

OUTPUT INDEX



PRICE INDEX



AUGUST 5, 1961

WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	125.0	124.6	123.0
Chemical Week wholesale price index (1947=100)	110.8	110.8	107.3
Stock price index (12 firms, Standard & Poor's)	53.14	52.71	47.05
Steel ingot output (thousand tons)	1,858	1,860	1,550
Electric power (million kilowatt-hours)	15,829	15,071	14,830
Crude oil and condensate (daily av., thousand bbls.)	6,948	6,930	6,855

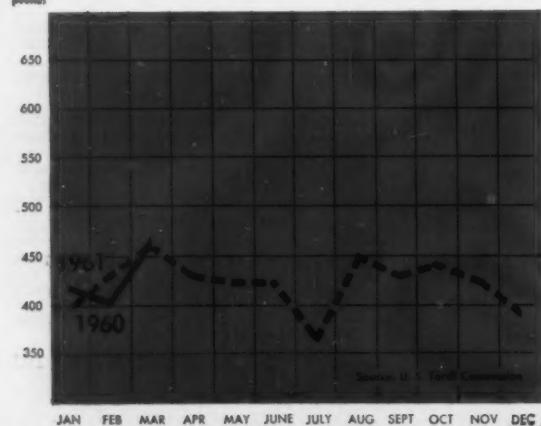
PRODUCTION INDICATORS

(1957=100, without seasonal adjustment)

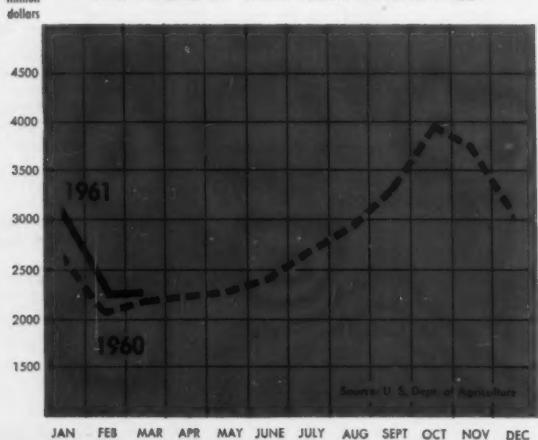
	Latest Month	Preceding Month	Year Ago
All manufacturing	110	108	110
Nondurable goods manufacturing	117	116	116
Durable goods manufacturing	105	103	106
Chemicals and allied products	128	127	124
Industrial chemicals	133	131	129
Petroleum and coal products	112	110	111

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS



CASH RECEIPTS FROM FARM MARKETINGS



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use or sell more equipment. □ Where does Gulf fit into the picture? Gulf provides the chemical industry with basic petrochemicals—the vital ingredient that increases your pleasure and the dollar returns in photography and in hundreds of other industries. Find out how Gulf Petrochemicals can serve you. Write or call our Sales Office, 360 Lexington Avenue, New York 17, New York.

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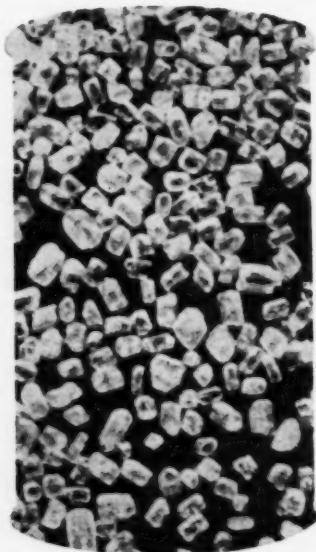


PETROCHEMICALS DEPARTMENT, GULF OIL CORPORATION, PITTSBURGH, PENNSYLVANIA



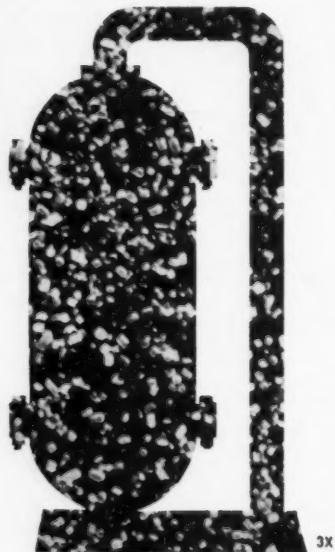
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GENERAL CHEMICAL DIVISION

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